"STUDY OF THE EFFECT OF MENTHA (mint) (*Mentha arvensis*) ALONG WITH PROXIMATE NUTRIENTS ON THE PERFORMANCE OF CHICKS"

A
Thesis

Submitted to the University of Allahabad
for the award of the Degree of

DOCTOR OF PHILOSOPHY

IN

ANIMAL SCIENCE

By

Umesh Kumar Shukla
M.Sc. Animal Science

2003

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ALLAHABAD
ALLAHABAD-211002
INDIA

ENROLMENT NO. 01AU/400

Dedicated to

my beloved

Father

Shri Rama Shankar Shukla

and

Mother

Smt. Sushila Shukla

Phone : 461236

DEPARTMENT OF CHEMISTRY

UNIVERSITY OF ALLAHABAD
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Date .....

Prof. (Dr.) I.C. Shukla,
Former Head, D. Phil, D.Sc., F.I.C,
Department of Chemistry
University of Allahabad

To,
The Registrar
University of Allahabad
Allahabad.

Dear Sir,

It is a great pleasure to forward D. Phil thesis entitled "**Study of the effect of mentha (mint) along with proximate nutrients on the performance of chicks**" being submitted by **Mr. Umesh Kumar Shukla** in fulfillment of the requirements for award of the degree of **DOCTOR OF PHILOSOPHY** in **ANIMAL SCIENCE** of the university of Allahabad.

It is certified that Mr. Umesh Kumar Shukla has completed his research work for full period prescribed under reference embodies the results of the investigation carried out by the candidate under my supervision. It is further verified that the candidate satisfies all the condition of the thesis for the award of the degree of Doctor of Philosophy.

Thanking you,

Sincerely yours,

I.C. Shukla

Date: 28/8/03
Place:

I.C. Shukla
Former Head,
Department of Chemistry
University of Allahabad

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ACKNOWLEDGEMENT

All the glory of the almighty, whose blessing is the success behind this thesis, I bow down with humility and gratitude before my sovereign, Almighty God for his blessing being care and faithfulness.

The conventional stereo-typed way of expressing thanks in the thesis is rather restrictive in both expression and quantum, yet it is apparently the only was available.

Words fail to express my deep sense of indebtness, profound gratitude and best regards to my supervisor Prof. (Dr.) Ishwar Chandra Shukla, Former Head, Department of Chemistry, University of Allahabad for his keen interest, generous encouragement and for his painstaking efforts, immense coordination, untiring inspirations, sympathetic behaviour, infinite labour, affectionate guidance and moral support.

With profound sense of gratitude, place on record my sincere thanks to Prof. (Dr.) Jagdish Prasad, Dean, College of Veterinary Science, A.A.I.D.U, Allahabad, for his valuable guidance and suggestions to carry out the analysis. I wish to express my heartfelt thanks to Research Committee, Head of Faculty members of Chemistry Department, Allahabad University, Allahabad.

I acknowledge with great pleasure my sincere thanks to Dr. Harimesh Singh Chauhan, Scientist, CIMAP, Lucknow, Dr. Neeraj (Associate Professor), Dr. P. Kumar, Dr. (Mrs.) Anupama Mukherjee, Dr. Ramesh Pandey, Shri Ram Pal, (Lecturer, College of Veterinary Science, A.A.I.D.U, Alld.), Dr. Rajandra Agrawal, Dr. P.C. Gupta, (Former Head), Dr. Ranakrishnapal Singh, Dr. Mrs. Krishna Mishra, Dr. J.D. Pandey, and all the non-teaching staff of Dept. of Chemistry, University of Allahabad.

I also express my deep gratitude to Dr. Shiv Gopal Mishra (Former Director, Shila Dhar Institute, Allò. and Secretary Vigyan Parishad, Prayag), Dr. Piyush Goel, J.A., Deptt. of Bio-Technology, New Delhi, Dr. A.K. Gupta, Head, Deptt. Of Biochemistry, A.A.I.D.U., Dr. Prabhakar Diwedi, (Former Head), Dr. Rananjay Singh, Dr. S.C. Chaubey, (Lecturer), Dept. of Animal Husbandry, Kulbhasker Ashram Degree College, Allò.), Dr. P.C. Srivastava, (Former Head, Botany), Dr. Vinita Shukla, (Lecturer), C.M.P. Degree College, Allò., Dr. Raja Ram, (Reader, Dept. of Physics) and also thanks to Dr. Suprabhat Mukherjee (Head, Dept. of Botany, H.N.B.G College, Naini, Allò.), Dr. Umashankar Mishra, (Head, Dept. of Bio-Chemistry, Gramodaya Vishwa Vidyalay, Chitrakut), Dr. Anil Kumar Mishra (Sr. Scientist, Animal Breeding, Rajasthan), Dr. Promod Mishra (Ag. Economics), Dr. M.P. Yadav (Physics).

The authors delighted to cite his friends Mr. Kaushik Bhattacharya, Mr. Ashok Gupta, Mr. Ashok Singh, Mr. Amit Saha, Mr. Sailesh Singh, students of M.Sc. Animal and Poultry Science, College of Vet. Science and Dr. Ashok Tiwari, Mr. B.K. Dubey, Mr. Anurag Dubey, Mr. Parimal Diwedi, Miss Renu Upadhaya, Miss Kushum Pandey, Mr. Praveen Singh, Mr. Ashutosh Tiwari, Mr. D.N. Tiwari, Mr. S. Mishra Students of Dept. of Chemistry, University of Allahabad, for their valuable suggestion stance during my study in the department.

It is authors pleasure to express his sincere thanks to Shri Anupam Ji, Shri Subash Ji, Shri Manoj Ji, Shri Vijay Ji, Shri Hansraj Ji, Shri Parmanad Ji, Shri Jagdish Ji, Shri Arvind Ji, Shri Niren Ji, Mr. Dayanand Ji, Mr. Praveen Ji, Mr. Debobrath Dewedi, Mr. Chandrabhan Singh, (Vigyan Parishad), who really took pains in helping me during the investigation. The cheer and love from them kept me side from day to day.

It is a great pleasure to express my sincere thanks to Dr. Bhagbat Prasad Pandey (M.O.), Shri Ashok Upadhaya, Mr. Anil Singh, Mr. Rohit, Mr. Ajay Singh, Mr. Sanjay Singh, Mr. Alokchandra Pandy, Joity Bhai, Shri Radhye Shayam Shukla, Mr. Atul, Mr. Bipul and Mr. Kirti Shukla, Mr. Vivek Shukla, Mr. Ajay Pandey, Mr. Asok Singh, Mr. Anuraag Tiwari who helped me to complete my research work.

I bow my head before beloved parents Shri Rama Shankar Sukla and Smt. Sushila Sukla and my Uncle Shri H.P. Shukla and unti Smt. M. Shukla for their blessings and endless love without which it was not possible for me to complete the entire course of study.

It is authors pleasure to express his sincere thanks to who devoted substantial part of their time to time. On our whelmed with sincere feeling of indebtness to my elder brother Shri M.K. Shukla, (Adv., High Court), Hav. Shri K.K. Shukla (Pharmacist), Mr. S.K. Shukla (Lect.), Mr. Manish, Mr. Avnish, Mr. Rajnish, Mr. Ashish, Mr. Sudhir Shukla and my sisters Smt. Sushma Mishra, Smt. Sheema Mishra, Smt. Manju Tiwari, Anju Tiwari, Smt. Baby Tiwari and Neelu Shukla and my cousin Sarvazaya, Amit, R.N. Mishra, Nandu, Srishti and Anshu for their inspirations, encouragement and generous love.

Date: 25-8-2003
Place: Allahabad

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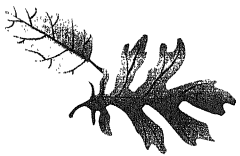
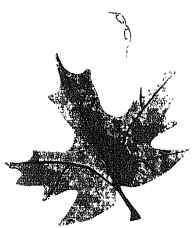
LIST OF ABBREVIATIONS

ANOVA	Analysis of variance
A.D.	After death
Cal.	Calculated
C.D.	Critical difference
^{0}C	Degree Centigrade
d.f.	Degree of freedom
F.A.O.	Food and Agricultural Organization
et al.	and Others
F.C.R.	Food conversion ratio
Fig.	Figure
g.	Gram
I.C.A.R.	Indian Council of Agricultural Research
J.	Journal
K(cal.)	Kilocalorie
Kg.	Kilo-gram
Ltd.	Limited
Max.	Maximum
Min.	Minimum
M.E.	Metabolizable
M.S.S.	Mean sum of square
M.T.	Metric tonnes
No.	Number
N.S.	Non significant
P	Phosphorus
Pvt.	Private
R	Replication
S	Significant
sq. ft.	Square feet
S.S	Sum of square
Tab.	Table
t	Treatment
(-)	Not available
%	Percentage



CHAPTER - 1

Introduction



INTRODUCTION

Poultry keeping for commercial production of eggs and meat, is one of the India's most innovative industries. Poultry includes several kinds of birds such as chickens, ducks, geese, turkey, guinea fowls etc (Table 1.1).

Broiler is a young chicken of either sex below 8^{th} to 10^{th} weeks of age weighing 1.2 to 2.0 kg body weight with a tender soft pliable smooth textured meat and flexible breast. Roaster on the other hand is also a young chicken but much older (12^{th} to 16^{th} weeks) and heavier than broilers. It may be of either sex with meat soft pliable, smooth textured skin and breast bone cartilage are somewhat less flexible than that of a broiler. Cockerel is the egg type male bird upto 1 year age, has breast bone less flexible with more fibrous and less juicy meat.

Presently cockerels and layer chicks rearing has become popular with many poultry men in some pockets of the country. Broiler chicks attain marketable weight in 4 weeks while cockerels and layer chicks requires a long time (10-12) weeks. Broilers require less feed. The feed conversion ratiois also poor in cockerels as compared to broilers. The efficiency of feed utilization is poor in both cockerels and layer chicks in comparison with broilers. During the decade of the seventies the broiler chicks production made its beginning from 4 million in 1971 to a level of 230 million by 1991. Similarly layer chicks production was 87 million in 1986, reached upto 125 million in 1991. It is now estimated to reach 400 million (Panda, 1992, Table 1.2).

Table 1.1. Population of Poultry in India

S.N.	State/Union territories	Fouls			Ducks			Other	Total poultry
		Desi l	Improved	Total	Desi	Improved	Total		
1.	A.P.	21476	10365	31841	492	27	519	32	32392
2.	Assam	6765	801	7566	2146	742	2888	37	10491
3.	Bihar	13431	335	13766	692	17	709	513	14988
4.	Gujrat	2771	789	3560	8	1	9	3	3572
5.	Haryana	502	1504	2006	5	2	7	1	2014
6.	H.P.	328	133	461	A	A	A	a	461
7.	J & K	1923	271	2194	184	13	197	16	2407
8.	Karnataka	9528	2358	11886	121	69	190	21	12097
9.	Kerala	6565	7954	14519	509	21	530	34	15083
10.	M.P.	7681	590	8971	53	2	55	57	8333
11.	Maharashtra	16341	3428	19769	58	2	60	15	19814
12.	Manipur	1367	887	2254	325	257	582	25	2861
13.	Meghalaya	-	-	-	-	-	-	-	1419
14.	Nagaland	767	173	940	17	10	27	11	978
15.	Orissa	9985	247	10232	312	8	320	124	10676
16.	Punjab	-	-	-	-	-	-	-	9657
17.	Rajasthan	1870	343	243	5	1	6	(a)	2219
18.	Sikkim	206	40	246	6	(a)	6	(a)	252
19.	Tamil Nadu	12665	5166	17831	443	10	453	-	18284
20.	Tripura	756	40	796	213	11	224	59	1079
21.	U.P.	4858	1756	6614	144	33	177	67	6858
22.	W.B.	17417	3177	20594	7624	201	7825	251	28670
23.	A & N Island	266	32	289	22	(a)	22	(a)	320
24.	A.P.	732	27	759	5	-	5	-	764
25.	Chandigarh	1	159	160	(a)	(a)	(a)	(a)	161
26.	Dadra & Nagar Havsli	50	5	556	(a)	(a)	(a)	-	56

27.	**Delhi**	11	207	218	(a)	(a)	(a)	(a)	219
28.	**Goa, Daman & Due**	388	253	641	2	(a)	2	(a)	643
29.	**Lakshadeep**	20	13	33	1	1	2	-	35
30.	**Mizoram**	603	84	687	2	2	4	(a)	691
31.	**Pondicherry**	125	31	156	9	(a)	9	(a)	165
All India		139398	41168	180565	13398	1430	14828	1266	207739

(a) = Below 500

Source : *Poultry Business Directory*, 93-94.

The National Commission of Agriculture has projected demand of poultry meat to 300, 000 tonnes by the year 2000 for the human population which is estimated at one billion by that year. According to the estimates of the year 2000, broilers production has crossed 488 million marks, providing additional job opportunities to about three lakhs people. Today India is 22nd largest broiler chicks producer in the world. The world production of poultry meat is 32.8 million MT. in which India's share is 0.32 million MT (**FAO, 1990**).

National Institute (C.F.T.R.I) recommended consumption of 10.8 kg meat per capita per annum. Taking into account meat from all sources the per capita availability amounts to 1.5 kg/year of which poultry meat accounts for about 850 g, which is 56.0 % of all meat (Table 1.2).

Table 1.2. Annual production and per capita availability of eggs, broilers and poultry meat.

Year	Production			Per capita availability	
	Egg (million)	Broilers (million)	Poultry meat (1000 tonnes)	Eggs	Chicken (g)
1961	2881	0	81	7	188
1971	5340	4	121	10	220
1980	12500	30	179	18	266
1985	16128	75	274	22	365
1990	23300	190	412	28	498
1991	23550	215	440	28	521
1992	22740	210	427	26	493
1993	24800	235	454	28	517
1994	26290	275	507	29	566
1995	28130	330	578	31	633
1996	30000	400	659	32	707
1998	36600	488	975	36	850

Source: Annual Report, Deptt. of Animal Husbandry Dairying Ministry of Agriculture, Govt. of India (1994-1995).

On an average we take daily only 47.8 gm of protein and 1970 calories energy against an average minimum requirement of 61 gm of protein and 2130 calories of energy as recommended by National Advisory Council in India. (**Som, 1976**). Most of this protein (80%) comes from vegetable sources (**Mukherjee, 1976**) compared the people of advanced countries who are getting about 90 gm of the total protein of which 50 gm alone is from animal protein. Protein can be obtained from both animal and vegetable sources but those of animal origin yield higher quantities (97%) of absorbable protein compared to protein from vegetable sources. Proteins of animal sources have a high biological value as they contain all the essential amino acids

which are very valuable in replacing and maintaining the body proteins and building up the body cells. Meat is also good sources of fat which provides energy and is rich in P, Fe and Cu. Meat is also richest sources of Vitamin B, particularly Thiamine (B_1), Riboflavin (B_2), Niacin and Vitamin A. Intake of animal protein in India is very low compared to other countries because of vegetarian food habit and orthodox feeling of people. Among the preparation Indians prefer chicken more than any other meat because of the religious taboo on beef products. Thus broiler industry shall develop still further and chicken meat shall have more demand in India.

According to report of National Commission on Agricuiture, the demand for poultry meat during 1985 was 15 lakhs (15,000) tones and in 2000 AD. it was estimated at 3,00,000 tonnes. In case of broiler the number was estimated at 71.8 million for 2000 AD.

The increase in population and more demand for high protein diets of animal origin is increasing day by day. There is a persistent shortage of mutton for sheep and goat because there is no organized breeding effort to produce more meat. However with the introduction of new strain of broiler chicken it is ready for market around 6-8 weeks of age. Poultry meat contains vitamins, minerals and relatively little fat. Adequate balanced diet is the foundation for development of human mind and body, but about 50% of total world population is suffering from malnutrition (**Marshal, 1967**). Many people in our country are suffering from inadequate food as well as unbalanced diet, in which protein shortage is the most important factor. An average Indian diet is poorly balanced and deficient in protein, both in quality

and quantity. It is predicted that such unbalanced nutrition especially for younger generation will not only adversely effect their physical development but also limit the mental growth. The nutrition value of poultry meat has been given in (Table 1.3.)

Table 1.3. Composition of raw poultry meat

Species	Moisture (%)	Proteins (%)	Fat (%)	Ash (%)	Food energy Cal /100g
Chicken	74.	18 5	6.0	-	-
Broiler (8 weeks)	74.0	19.0	6.5	0.80	125
Spenthen	72.0	20.5	5.5	1.25	120
Quail (8 weeks)	70.5	20.0	-	1.20	125
Duck (8 weeks)	58.0	19.5	19.8	0.50	300
Turkey (mid)	60.0	-	18.0	1.00	270

1.1. Magical Mentha :

Mint which commonly known as Pudina in our country is a very good medicinal plant. It is used as medicine from ancient time.

Mint, a herb belongs to the family of aromatic herb. It grows upto about 25 cm high. The leaves are used for clinical purpose and as flavouring agent. The plant is considered antiseptic, stimulant and useful in digestive complaints and fever. The drug is used in treatment of flatulence, vomiting, diarrhoea and nausea. It has many properties such as antiseptic, insect repellent and is useful in treatment of stomach, disorder and lever inflammation, indigestion and in heat stroke. Following are the physico-chemical properties of mint (Choudhari and Nanda, 1955)

Sp. Gr.	0.8965 (at 30^0C)
$[a]_D$	-41.8^0
Acid value	1.4528 (at 30^0C)
Menthol (%)	46%
Ester as Methyle acetate (%)	18.2
Menthone	8.8
Solubility in 70% alcohol	2 vol and more

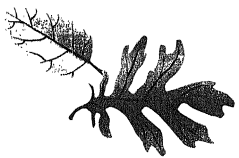
Mentha oil in India is mainly extracted from Mint (*Mentha arvensis*). It contains 4.14% esters as methyle acetate and 46% menthol. It can be cultivated in home during summer and rainy season. The most important thing obtained from mint is menthol having nice peppermint like odour. It is colourless having melting point between 41^0C to 44^0C. It is a volatile and soluble in water. Jain, (1963) reported that *Mentha piperitya* is antiseptic, anti-plasmodic, anti-inflammatory, antibacterial, anti-parasitic and also a stimulant. Such properties may help to improve digestibility and vitality in birds.

1.2. Justification of the study:

Mint which is commonly known as "Pudina" in our country, a medicinal plant is a good Ayurvedic medicine for indigestion and used by the human beings during hot and humid conditions and summer

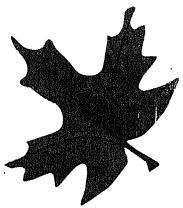
months. Human beings have a single stomach, like-wise poultry is also single stomach animal. Therefore mint may exert similar beneficial effects in birds too. With this in view the present investigation was undertaken with the following objectives:

1. To determine weekly body weight and feed consumption,
2. To determine weight gain and feed conversion ratio as influenced by different level of mint in diet, and
3. To determine carcass quality of broilers, cockerels and layer chicks reared on diets supplemented with different level of mint.



CHAPTER - II

Review of Literature



REVIEW OF LITERATURE

Pudina *(Mentha piperita)*

The plant is astringent and anthelmintic, useful in diseases of the heart, bronchitis, loss of appetite, diarrhoea and dysentery; causes anuria (Ayurveda).

Perkin and Everest (1936) reported that mash mint has a characteristic odour and aromatic taste and is used as emetic stimulant and astringent. It is also use d in gall and stomach disorders. It is used as flavouring agent also.

Chopra *et al.* (1946) stated that field mint is used locally as a stimulant and carminative. An infusion of leaves extract a remedy for rheumatism and indigestion.

Dutta (1952) reported that extracts of the drug also exhibit antibacterial, diuretic and mild sedative effects.

Kapoor *et al.* (1955) informed that an infusion of extract of leaves of field mint gives remedy from rheumatism and indigestion.

Muenscher and Rice (1955) reported that dried leaves and flowering tops of the plant are official in U.S. Pharmacopoeia under the name Peppermint. The herb is considered aromatic, stimulant, stomachic and carminative and used for allaying nausea, flatulence and vomiting. Bruised leaves are employed as an external application for relieving local pains and headache. A hot infusion is taken to allay stomach-ache colic and diarrhoea.

Nandkarni (1959) reported that peppermint oil is widely employed in flatulence, nausea and gastralgia. It has mild antiseptic and local anaesthetic properties It is used 4s an external application in rheumatism, neuralgia, congestive headache and toothache

Jain (1963) reported that *Mentha piperita is* antiseptic, antispasmodic, anti-inflammatory, antibacterial, anti-parasitic and is also a stimulant.

Krit and Basu (1967) reported that M. *angustifolium is* a shrub found in south Indian hill forests along river banks. The bark of the plant is used as a tonic and refrigerant.

Khanna and Staba (1968) studied that plant tissue culture (T.C) agar dishes of *Mentha piperita* showed antibacterial activity against *Escherichia coli.* Agar medium extract (AME) of *Mentha piperita* was active against *Staphylococcus aureus* and *Eschenchia coli.*

Baslas *et al.* (1973) reported that ethanolic extract of *Mentha piperita* possesses anti-inflammatory effect in acute and chronic inflammation.

Rama Rao (1978) reported that *M. malabaricum is* a herb has flowers and twigs are used for skin disease.

Krit and Basu (1980) reported that the herb gives remedy from infantile troubles, vomiting in pregnancy and hysteria. The leaves are used in favours and bronchitis.

Clark (1981) reported that *Mentha piperita* can be used for a variety of complaints including gastro intestinal disorders where antispasmodic, antiflatulent and appetite-promoting stimulation is required.

Krit and Basu (1982) reported that horsemint is considered carminative, antiseptic and stimulant. The leaves of *Var. incona* are astringent and used for rheumatic pains. A decoction of the plant is used in fever and heat apoplexy.

Aswal (1984) reported that Menthol, the main constituent of the volatile oil is antibacterial and anti-parasitic.

Singh (1997) reported that fresh leaves of *Mentha piperita* are used to relief local pains and headache.

Jaipurkar *et al.* (2002) in a experiment on use of three herbal drugs namely LR, DR and MR singly and in combination with Amprolium evaluated against experimental coccidiosis in broiler chicks. The parameters used were clinical signs, body weight gain, feed consumption, F.C.R., mortality percentage. From studies, it was found that these herbal drugs posses anti-coccidial activity. However, the activity can be best achieved when they were combined with Amprolium.

Ranade *et al.* (2002) reported that supplementation of herbal immuplus helped in improving F.C.R., without any significant difference in weight gain in the birds. It was further concluded that immuplus was effective for augmenting and maintaining the high level of antibody

titres and thus protecting the birds against IBD (Infectious brusal disease) and NCD (New castle disease) viruses.

Samarth *et al.* (2002) conducted an experiment on effect of Ashwagandha root powder on broiler performance. Ashwagandha has proved its effectiveness as on anti-stress agent and as one of the most potent adoptogenic **(Gandhi, 1994)**. It helps in increasing body resistance thereby making it more adopTable to internal and external stress factor **(Ghoshal and Sabinath, 1991)**. It does not show significant effect from growth from first to third week, but it shows significant effect in sixth week.

CHAPTER - III

Materials and Method

MATERIALS AND METHODS

The study was carried out in three phases. In first phase, the experiment was conducted to determine performance of day-old 108 broilers, while in second and third phase the similar experiment was conducted on 108 day-old cockerels and 108 day-old layer chicks, respectively.

Day-old chicks were procured from Arambagh Hatcheries Limited, Calcutta – 20, W.B. through Amit Agencies, Allahabad, U.P. These chicks were reared in the battery type cages in small animal laboratory of the Department of Animal Husbandry, Allahabad. Agricultural Institute, Allahabad, U.P.

The experiment was conducted for three different seasons i.e. (July to Aug) for broiler, (Sep to Oct) for cockerel and winter season (Dec to Jan) for layer for the period of six weeks for broilers and eight weeks for cockerels and layer chicks.

3.1. Allocation of day-old chicks:

In each experiment day-old 108 chicks were weighed, leg tagged and distributed randomly into nine groups for different treatments, namely T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, T_8, consisting of 12 birds in each.

Treatments	Test rations
T_0	Ration with zero (0) percent mentha
T_1	Ration with 0.25 percent mentha.
T_2	Ration with 0.50 percept mentha.
T_3	Ration with 0.75 percent mentha.
T_4	Ration with 1.0 percent mentha.
T_5	Ration with 1.25 percent mentha.
T_6	Ration with 1. 50 percent mentha.
T_7	Ration with 1 75 percent. mentha.
T_8	Ration with 2.00 percent mentha.

Birds were accommodated in cages. The birds of each treatment were further divided into two sub groups of six chicks in each to accommodate in cage of 5 sq. ft. size. The birds were fed self-prepared balanced feed ad lib. with different level of mint.

Self prepared broiler starter ration was given upto four weeks and broiler finisher ration from five to six weeks whereas cockerels and layer chicks were given chick mash for a period of eight weeks. The composition of ration used is given in Table 3.1.

Table. 3.1. Composition and proximate nutrients of broiler starter, broiler finisher and layer chick starter ration:

Ingredients (%)	Broiler starter ration	Broiler finisher ration	Layer chick starter ration
Maize	45.6	46.8	52
Rice polish	10	20	14
Ground nut cake	30	19	20
Bone meal	0.80	0.70	0.50
Salt	0.4	0.5	0.4
Min-mix & Vit. mix	0.1	0.1	0.1
Proximate nutrients			
Crude protein	23.1	20.31	20.11
Crude fiber	5.36	5.51	5.05
Ethar extract	6.1	6.67	6.1
Nitrogen free extract	55.06	69.89	58.64
Calcium	1.43	1.34	1.32
Phosphorous	0.61	0.69	0.8
ME. K. Cal./Kg	2912.60	3000.00	2700.00

Initial weight of each chick was recorded on arrival and then weekly to determine the growth rate. The feed consumption was also recorded weekly to determine the feed conversion ratio (F.C.R.) of chicks. The mortality record of chicks was maintained during the experimental period.

Green mint was purchased from Khuldabad Mandi of Allahabad. It was dried in the shade for three to four days initially and then in oven at 60^0C upto moisture level below 10%. Then its leaves were crushed manually to make its fine powder. It was passed through wire mesh to obtain uniform powder. Then it was mixed with feed according to treatments.

3.2. Housing feeding and management:

Chicks were housed in battery type cages providing 0.8 sq.ft./bird space. Cages, feeders, waterers and other equipments were properly cleaned, disinfected and finally sterilized by blow torch before use.

The waterers were disinfected with .02% $KMnO_4$ solution every day in the cages of each group a 15 watt bulb in rainy season and a 40 watt bulb in winter season was provided for light during night. Water was distributed at 7.00 A.M and 8.00 P.M every day ad lib.

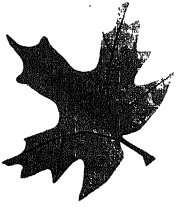
Broilers, cockerel and layer chicks of all treatments were kept under similar management practices in battery type metal cages in small Animal Laboratory of the Department of Animal Husbandry, Allahabad Agricultural Institute, Allahabad. The data collected were tabulated and statistically analyzed to determine significant differences between treatments as per CRD (**Chandel, 1998**) as follows:

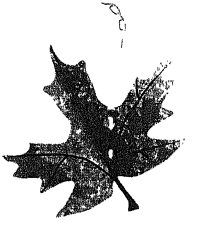
Table 3.2. Analysis of variance (ANOVA):

Source of variation	d.f	S.S	M.S.S.	F value		Result S/NS
				Cal	T(5%)	
Treatments	(t-1)	SS due to treatments	$\frac{ss(t)}{(t-1)}$ = MtSS	$\frac{MtSS}{EMSS}$	F(t-1)	
Replicates	(r-1)	SS due to replicates	$\frac{SS(R)}{(r-1)}$ = MRSS	$\frac{MRSS}{EMSS}$	F(r-1)	
Error	(t-1)(r-1)	Error SS	ESS(t-1)(r-1) = EMSS			
Total	(rt-1)					

CHAPTER - IV

Results and Discussion





RESULTS AND DISCUSSION

4.1 BODY WEIGHT OF BROILER CHICKS:

The data regarding body weight of broiler chicks from day old to six weeks of age are presented in Table 4.1 to 4.16.

4.1.1 Body weight of day old chicks:

The data regarding body weight of day old chicks randomly distributed in nine treatments are presented in Table-4.1. The following observations were made.

1. In general, the body weight of day old broiler chicks ranged from 34 to 44 g.

2. The body weight of day old chicks in nine treatments namely T_0, T_1, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 34 - 43, 35 - 44, 36 – 43, 38 – 44, 35 – 43, 35 – 42, 36 – 41, 37 – 44, 38 – 43 g, respectively.

3. The mean body weight of day old broiler chicks in T_0, T_1, T_3, T_4, T_5, T_6, T_7, and T_8 was 38.66, 39.16, 39.33, 40.66, 39.33, 38.50, 38.83, 39.83, 40.50 g, respectively.

4. Irrespective of treatment the mean body weight of day old broiler chicks ranged from 38.44 to 41.00 g, respectively.

5. The differences in body weight of day old broiler chicks between treatments were non-significant (Table - 4.2).

RESULTS AND DISCUSSION

4.1 BODY WEIGHT OF BROILER CHICKS:

The data regarding body weight of broiler chicks from day old to six weeks of age are presented in Table 4.1 to 4.16.

4.1.1 Body weight of day old chicks:

The data regarding body weight of day old chicks randomly distributed in nine treatments are presented in Table-4.1. The following observations were made.

1. In general, the body weight of day old broiler chicks ranged from 34 to 44 g.

2. The body weight of day old chicks in nine treatments namely T_0, T_1, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 34 - 43, 35 - 44, 36 – 43, 38 – 44, 35 – 43, 35 – 42, 36 – 41, 37 – 44, 38 – 43 g, respectively.

3. The mean body weight of day old broiler chicks in T_0, T_1, T_3, T_4, T_5, T_6, T_7, and T_8 was 38.66, 39.16, 39 33, 40.66, 39.33, 38.50, 38.83, 39.83, 40.50 g, respectively.

4. Irrespective of treatment the mean body weight of day old broiler chicks ranged from 38.44 to 41.00 g, respectively.

5. The differences in body weight of day old broiler chicks between treatments were non-significant (Table - 4.2).

From the data on body weight of day old broiler chicks furnished in Table 4.1. It may be noted that in general, the body weight of day old chicks ranged from 34-44 g The mean highest body weight of day old chicks was recorded 40.66 g in T_3 followed by 40.50 g in T_8, 39.83 g in T_7, 39.33 g in T_4 and T_2, 39 16 g in T_1, 38.83 g in T_6, 38.66 g in T_0 and 38.50 g in T_5 However, the differences in these values were found non-significant, indicating thereby a proper distribution of chicks in the treatments without bias.

Table 4.1. Average body weight (g) of day old broiler in different treatments.

Replications	Treatments Average body weight (g) of day old broilers									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	38	43	42	38	39	38	37	39	41	39 44
2.	41	40	38	42	35	38	40	42	41	39 66
3.	38	36	39	38	39	35	41	39	41	38 44
4	38	44	43	42	43	38	36	44	41	41 0
5.	34	37	38	44	38	42	41	37	38	38 77
6.	43	35	36	40	42	40	38	38	41	39 22
Mean	38 66	39.16	39.33	40.66	39.33	38 50	38.83	39 83	40 50	39 42

Table 4.2. ANOVA for the data on body weight (g) of day old broilers contained in Table 4.1.

Source of variation	d.f	s.s	M S S	F. Value		Results
				Cal	Table (5%)	
Treatments	8	28 37	3 54	0.50 4	2.18	NS
Replications	5	35.65	7 13	1.01	2.45	NS
Error	40	281.19	7 02			
Total	53	345.21				

NS – Non-Significant

Mean body weight of day old broilers (g)

Treatments

T_3	T_8	T_7	T_4	T_2	T_1	T_6	T_0	T_5
40.66	40.50	39.83	39.33	39.33	39.16	38.83	38.66	38.50

4.1.2. Average body weight of broilers at first week of age (g):

The data regarding body weight of broilers of different treatments are presented in Table 4.3 and ANOVA of the same is given in Table 4.4. The following observations were made.

1) Irrespective of treatment, the body weight of broilers at first week of age ranged from 70-120 g and overall mean body weight was 98.29 g.
2) The body weight of broilers at first week of age in namely T_0, T_1, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 82-107, 70-120, 78-94, 96-104, 81-115, 87-114, 81-113, 80-110, 90-113 g, respectively.
3) The mean body weight of broilers at first week of age in namely T_0, T_1, T_3, T_4, T_5, T_6, T_7, and T_8 was 97.33, 99.50, 89.33, 101.33, 100.33, 96.66, 99.5, 100.0 and 100.66 g, respectively.
4) The differences in body weight of broilers at fist week of age between treatments were non-significant (Table 4.4).

From the perusal of data contained in Table 4.3, it was observed that irrespective of treatment the body weight of broilers ranged from 70-120 g. The highest mean body weight of broilers at first week of age was recorded in T3 (101.33 g) followed by T8 (100.66 g), T4 (100.33 g), T7 (100.0 g), T6 (99.5 g), T1 (99.5), T0 (97.33 g), T5 (96.66) and T2 (89.33). However, the differences in these body weights of broilers were found non-significant indicating thereby a non-significant effect of treatments on body weight of broilers at first week of age.

Table 4.3. Average body weight (g) of broilers at first week of age in different treatments.

Replications	Treatments Average body weight (g) of broiler at first week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	103	114	90	103	112	89	113	110	98	103.55
2.	107	109	78	99	81	95	106	80	113	96.44
3.	91	93	90	104	100	87	104	105	90	96.0
4.	96	120	91	104	101	95	90	10	109	101.22
5.	82	91	93	96	93	100	103	103	102	95.88
6.	105	70	94	102	115	114	81	97	92	96.88
Mean	97.33	99.5	89.33	101.33	100.33	96.66	99.5	100.0	100.86	98.29

Table 4.4. ANOVA for the body weight of broilers at first week of age (g) in different treatments contained in Table 4.3.

Source of variation	d.f	s s	M S.S	F. Value		Resu
				Cal	Table (5%)	
Treatments	8	594.15	74.26	0.559	2.18	NS
Replications	5	279.03	55.80	0.420	2.45	NS
Error	40	5313.97	132.84			
Total	53	6187.15				

NS = Non-Significant

Mean body weight of broilers at first week of age (g)

Treatments

T_3	T_8	T_4	T_7	T_5	T_1	T_0	T_6	T_2
101.33	100.66	100.33	100.0	99.5	99.5	97.33	96.66	89.33

4.1.3. Average body weight of broilers (g) at second week of age:

The data regarding body weight of broilers at two week of age in different treatments are presented in Table-4.5 and ANOVA of the same is given in Table 4.6. The following observations were made.

1. Irrespective of treatment, the body weight of broilers of two week of age ranged from 127-290 g (mean 203.79 g).
2. The average body weight of broilers at two week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 ranged from 167- 225, 158- 290, 127-231, 164-223, 170277, 186-245, 159-261, 195-226 and 172-267 g, respectively.
3. The mean body weight of broilers at second week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 194.,5, 210 5, 179.5, 194.66, 222 0, 205.0, 210 83, 216.33 and 200.83 g, respectively.
4. The differences in body weight of broilers of two week of age between treatments were non-significant (Table-4.6).

From the data contained in Table-4.5 , it was observed that the highest mean body weight of broilers of two week of age was recorded in T_4 (222.02) followed by T_7 (216.33g), T_6 (210.83 g), T_1 (210.5g,), T_5 (205.0 g), T_8 (200.83 g). T_3 (194.66 g), T_0 (194.50 g) and T_2 (179.50 g). However, the differences in these values of broilers of second week of age were found to be nonsignificant indicating thereby a non-significant effect of treatments on body weight. It showed that all treatments were at par with control (T_0).

Table 4.5. Average body weight (g) of broilers at second week of age in different treatments.

Treatments Body weight of broilers at second week of age										
Replications	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1	225	240	170	223	277	195	261	221	209	224 55
2.	219	215	175	206	206	186	225	195	267	210.44
3.	176	198	188	205	170	190	198	220	176	191 22
4.	208	290	231	170	206	218	202	226	172	213 66
5.	172	158	127	200	242	196	220	220	200	192 77
6.	167	162	186	164	231	245	159	216	181	190.11
Mean	194 !	210 5	179 5	194.66	222 0	205 0	210 83	216 33	200 83	203 79

Table-4.6. ANOVA for the data on body weight of broilers at second week of age (g) contained in Table-4.5.

Source of variation	d.f	s.s	M S.S	F Value		Result
				Cal.	Table (5%)	
Treatments	8	7598.26	949 78	1 01	2.18	NS
Replications	5	10396 82	2079 36	2 22	2.45	NS
Error	40	37460 52	936 51			
Total	53	55455.6				

NS = Non-Significant

Mean body weight of broilers at second week of age (g)

Treatments

T_3	T_5	T_7	T_6	T_8	T_1	T_0	T_2	T_4
222.0	216.33	210.83	210.5	205.0	200.83	194.66	194.5	179.5

4.1.4. Average body weight of broilers (g) at third week of age.

The data regarding body weight of broilers of different treatments are presented in Table - 4.7 and ANOVA of the same is given in Table - 4.8. The following observations were made:

1. Irrespective of treatments, the body weight of broilers at third week of age ranged from 163 to 507 g (mean 359.40 g)
2. The mean body weight of broilers at third week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 334.5, 334.83, 314.5, 334.66, 413.33, 366.16, 376.66, 397.83 and 362.16 g, respectively.
3. The average body weight of broilers at third week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 ranged from 163-428, 252-410, 267-410, 269-387, 322-507, 330-424, 294-470, 375-412 and 277-490 g, respectively.
4. The differences in body weight of broilers at third week of age due to treatments were non-significant (Table-4.8).

From the perusal of data contained in Table 4.7 it was noted that the highest mean body weight of broilers at third week of age was recorded in T_4 (413.33g) followed by T_7 (397.83g), T_6 (376.66g), T_5 (366.16g), T_8 (362.16g), T_1(334.83g), T_3 (334.66g), T_0 (334.5g), T_2 (314.5g). However, the differences in these body weights of broilers were found non-significant indicating thereby a non-significant effect of treatments on body weight of broilers at third week of age.

Table 4.7. Average body weight of broilers (g) at third week of age in different treatments.

Treatments										
Body weiaht of broilers at third week of age										
Replications	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1	375	410	267	350	507	347	470	375	375	336 22
2.	428	362	298	269	384	330	418	395	490	374 88
3.	355	337	330	387	322	340	354	407	356	354 22
4.	375	336	410	374	367	420	342	412	277	370 33
5.	311	252	277	335	427	336	382	402	348	341 11
6.	163	312	305	293	453	424	294	396	327	329 66
Mean	334.5	334.83	314 5	334.66	413.33	366.16	376.66	397.83	362.16	359.40

Table 4.8.ANOVA for the data on body weight of broilers at third week of age (g) contained in Table-4.7.

Source of variation	d.f	s s	M S S	F. Value		Result
				Cal.	Table (5%)	
Treatments	8	51702 34	6462 79	1.92	2.18	NS
Replications	5	22027 78	4405 55	1 31	2.45	NS
Error	40	133967 22	3349 18			
Total	53	207697 34				

NS = Non-Significant

Mean body weight of broilers at third week of age (g)

Treatments

T_4	T_7	T_6	T_5	T_8	T_1	T_3	T_0	T_2
413.22	397.83	376.66	366.16	362.1	334.83	334.66	334.5	314.5

4.1.5 Average body weight (g) of broilers on fourth week of age.

The data regarding body weight of broilers at four weeks of age in different treatments are presented in Table-4.9 and ANOVA of the same is given in Table-4.10. The following observations were made:

1. Irrespective of treatments the body weight of broilers at four weeks of age ranged from 270-860 g (mean 618.25g).

2. The average body weight of broilers at four weeks of age in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 ranged from 270-770, 430-630, 410-650, 500-730, 530-820, 540-710, 490-860, 610-780 and 510-800 g, respectively.

3. The mean body weights of broilers at four weeks of age in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 613.33, 565.0, 520.0, 611.0, 696.66, 613.33, 651.66, 665.0 and 628.33 g, respectively.

4. The differences in body weight of broilers at four weeks of age between treatments were significant (Table-4.10).

From the perusal of data contained in Table-4.9 it was noted that in general, irrespective of treatment the body weight of broilers at four weeks of age ranged from 270-860 g. The highest mean body weight of broilers was recorded inT_4 (696.66g) followed by T_7 (665.0g), T_6 (651.66g), T_8 (628.33g), T_5 (613.33g), T_0 (613.33g), T_3 (611.0g), T_1 (565.0) and T_2 (520.g). The differences in these values were found to be significant, indicating thereby a significant effect of treatment on the body weight of

broilers. The broilers of T_4 (696.6g) registered significantly higher body weight than the body weight of broilers in T_1 and T_2. The broilers of T_2 (520.0g) registered significantly less body weight than T_7 and T_6.

However, the differences in body weights of broilers in T_0, T_1, T_2, T_3, T_5, and T_8 were non-significant. Similarly the differences in body weight of broilers between T_0, T_1, T_3, T_5, T_6, T_7 and T_8 were non-significant. The broilers of T_0, T_3, T_4, T_5, T_6, T_7 and T_8 also registered the non-significant differences in the body weight being at par

Table 4.9. Average body weight (g) of broilers at fourth week of age in different treatments.

Replications	Treatments Average body weight (g) of broiler at fourth week									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	760	630	410	730	820	580	860	780	610	686.66
2.	770	610	470	626	680	540	670	640	800	645.11
3.	680	570	550	650	530	590	570	630	660	603.33
4.	630	580	650	630	690	710	590	610	510	622.22
5.	570	430	530	530	770	570	630	680	620	594.22
6.	270	570	510	500	690	690	490	650	570	548.88
Mean	613.33	565.0	520.0	611.0	696.66	613.33	651.66	665.0	628.33	617.25

Table 4.10. ANOVA for the data on body weight of broilers at fourth week of age (g) contained in Table 4.9.

Source of variation	d.f	s.s	M.S.S	F. Value		Result	C.D
				Cal.	Table (5%)		
Treatments	8	160989.04	20123.63	2.30	2.18	S	108.92
Replications	5	99978.15	19995.63	2.29	2.45	NS	-
Error	40	348571.04	8714.29				
Total	53	609539.04					

S – Significant NS – Non-Significant

Mean body weight of broilers at fourth week of age (g)

Treatments

T_4	T_7	T_6	T_8	T_5	T_0	T_3	T_1	T_2
696.66	665.0	651.66	628.33	613.33	613.33	611.0	565.0	520.0

4.1.6 Average body weight (g) of broilers at fifth week of age.

The data regarding body weight of broilers of different treatments are presented in Table- 4.11 and ANOVA for the same is given in Table-4.12. The following observations were made:

1. Irrespective of treatments the body weight at five weeks of age ranged from 470-1250 g (mean 949.06g).
2. The average body weight of broilers of five weeks of age in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 ranged from 470-1200, 780-1080, 610-1000, 840-1140, 8601210, 850-1060, 770-1120, 940-1250 and 790-1130g, respectively.
3. The mean body weight of broilers at five weeks of age in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 960.0, 886.66, 806.66, 956.66, 1053.33, 938.33, 916.66, 1041.66 and 981.66 g, respectively.
4. The differences in body weight of broilers at five weeks of age between treatments were non-significant (Table-4.12).

The perusal of data contained in Table-4.11 indicated that highest mean body weight of broilers at five weeks of age was observed in T_4 (1053.33g) followed by T_7 (1041.66g), T_8 (981.66g), T_0 (960.0g), T_3 (938.33g), T_6 (916.66g), T_1 (886.66g) and T_2 (806.66g). However, the differences in these body weights of broilers were found non-significant indicating thereby a non-significant effect of treatments on body weight of broilers at five weeks of age. This indicated that all test rations were at par.

Table 4.11. Average body weight (g) of broilers at fifth week of age in different treatments.

Replications	Treatments Average body weight (g) of broiler at fifth week									
	T_0	T_1	T_2	T_4	T_3	T_5	T_6	T_7	T_8	Mean
1.	1200	1080	610	1140	1210	850	1120	1250	1010	1052 22
2.	1130	910	740	960	1060	870	920	1010	1130	970 0
3.	1040	860	790	960	860	920	820	1020	1060	925.55
4.	970	820	1000	930	1040	1060	910	940	790	940 0
5.	950	780	910	910	1020	910	960	1020	9550	934.44
6.	470	870	790	840	1130	1020	770	1010	950	872 22
Mean	960	886.66	806 66	956 66	1053.33	938 33	916 66	1041.66	981.66	949.06

Table 4.12. ANOVA for the data on body weight of broilers at fifth week of age (g) contained in Table 4.11.

Source of variation	d f	s.s	M S S	F. \ alue		Result
				Cal.	Table (5%)	
Treatments	8	276137 04	34517 13	2.05	2.18	NS
Replications	5	160498 15	32099 63	1.91	2.45	NS
Error	40	672018 52	16800 45			
Total	53	1108653 71				

S – Significant NS – Non-Significant

Mean body weight of broilers at fifth week of age (g)

Treatments

T_4	T_7	T_8	T_0	T_3	T_5	T_6	T_1	T_2
1053.33	1041.66	981.66	960.0	956.66	938.33	916.66	886.66	806.66

4.1.7 Average body weight (g) of broilers at sixth week of age.

The data regarding body weight of broilers of different treatments are presented in Table-4.13 and ANOVA of the same is given in Table-4.14. The following observations were made:

1. Irrespective of treatment the body weight of broilers at six weeks of age ranged from 650-1570g (mean 1212.21g).
2. The average body weight of broilers at six weeks of age in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 ranged from 650-1500, 1050-1260, 760-1170, 950-1400, 1190-1450, 11301310, 960-1470, 1190-1570 and 1080-1510g, respectively.
3. The mean body weight of broilers at six weeks of age in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 1160.0, 1128.33, 1011.66, 1201,66, 1326.66, 1208.33, 1213.33, 1336.66 and 1323.33 g, respectively.
4. The differences in body weight of broilers at six weeks of age between treatments were non-significant (Table-4.14).

The perusal of data contained in Table-4.13 indicated that highest mean body weight of broilers at six weeks of age was recorded in T_7 (1336.66g) followed by T_4 (1326.66g), T_8 (1323.33g). T_6 (1213.33g) T_5 (1208.33g), T_3 (1201.66g), T_0 (1160.0g), T_1 (1128.33g) and T_2 (1011.66g). However, the differences in these values of body weights of broilers were found non-significant indicating thereby a non-significant effect of treatments on body weight of broilers at six weeks of age. This indicates that test rations didn't have any affect on body weight of broilers being at par.

Table 4.13. Average body weight (g) of broilers at sixth week of age in different treatments.

Replications	Treatments Average body weight (g) of broiler at sixth week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	1500	1260	760	1400	1450	1130	1470	1570	1340	1068.8
2.	1350	1190	1000	1290	1350	1170	1270	1260	1410	1254.4
3.	1150	1070	1010	1230	1190	1210	1180	1260	1510	1201.1
4.	1160	1070	1170	1200	1290	1290	1190	1410	1080	1206.6
5.	1150	1130	1140	1140	1350	1140	1210	1190	1330	1197.7
6.	650	1050	990	950	1330	1310	960	1330	1270	1093.3
Mean	1160	1128.33	1011 66	1201.66	1326.66	1208 33	1213.33	1336.66	1323.33	1212.2

Table 4.14. ANOVA for the data on body weight of broilers at sixth week of age (g) contained in Table 4.13.

Source of variation	d.f	s.s	M.S.S	F. Value		Result
				Cal.	Table (5%)	
Treatments	8	546266.67	68283.33	0.001	2 18	NS
Replication	5	251066.67	50213 33	0.001	2.45	NS
Error	40	14407996.00				
Total	53	15205329.34				

S – Significant NS – Non-Significant

Mean body weight of broiler at sixth week of age (g)

Treatments

T_7	T_4	T_8	T_6	T_5	T_3	T_0	T_1	T_2
1336.66	1326.66	1323 33	1213.33	1208.33	1201.66	1160.0	1128.33	1011 66

4.1.8 Weekly average body weight of broilers:

The data regarding weekly average body weight of broilers are presented in Table-4.15 and ANOVA of the same is given in Table-4.16. The following observations were made·

1. Irrespective of treatment, the average body weight of broilers at the age of first, second, third, fourth, fifth and sixth weeks ranged from 89.33-101.33, 179.5-222.0, 314.5-413.33, 520.0-696.66, 806.66-1053.33 and 1011.66-1336.66 g, respectively.
2. The mean body weight of broilers irrespective of treatments, at first, second, third, fourth, fifth and sixth weeks of age was 98.20, 203.79, 359.40, 616.40, 949.06 and 1212.21 g, respectively.
3. The average body weight of broilers at six weeks of age in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 1160.0, 1128.33, 1011.66, 1201.66, 1326.66, 1208.33, 1213.33, 1336.66, 1323.33 g, respectively.
4. The mean body weight of broilers in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 559.94, 537.47, 486.94, 566.66, 635.38, 571.30, 575.33, 626.24 and 599.35 g, respectively.
5. The differences in body weight of broilers between treatment as well as weeks were significant. (Table-4.16).

From the perusal of data content in Table-4.15, Figure 4.1 and Figure 4.2, it was observed that the broilers of T_4 registered highest body weight (635.38g) followed by T_7 (626.24g), T_8 (599.35g), T_6 (575.33 g), T_5 (571.30g`, T_3 (566.66), T_0 (559.94 g), T_1 (537.47) and T_2 (486.94 g). Since the differences in these values of body weight were found significant, it

indicated a significant effect of treatment on body weight of broilers. The broilers of T_2 registered significantly lowest body weight than broilers of T_0, T_1, T_3, T_4, T_5, T_6, T_7 and T_8. However, the differences between the body weight of broilers in T_0 and T_1 were found non-significant at par. Similarly the differences in body weight of broilers of T_0, T_3, T_5 and T_6 were also found non-significant. The body weight of broilers of T_4 and T_7 and T_7 did not differ significantly. The highest body weight of broilers was recorded in sixth week (1212.21g) followed by fifth (949.06g), fourth (616.40g), third (359.40g), second (203.79g) and first (98.20g) week. This was as expected due to increase in growth with age.

Table 4.15. Weekly average body weight (g) of broilers in different treatments.

Weeks	Treatments Weekly average body weight [g] of broilers									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	97.33	99 5	89 33	101 33	100 33	96 66	99 5	100 0	99.83	98 20
2.	194.5	210.5	179 5	194 66	222 0	205 0	210.83	216 33	200.83	203 79
3.	334.5	334.83	314 5	334 66	413 33	366.16	376.66	397.83	362 16	359.40
4.	613.33	565 0	520 0	611 0	696 66	613.33	635.0	665 0	628 33	616 40
5.	960.0	886.66	806 66	956 66	1053 33	938 33	916.66	1041.66	981 66	949 06
6.	1160.0	1128 33	1011.66	1201 66	1326 66	1208 33	1213 33	1336 6	1323 33	1212.21
Mean	559.94	537 47	486.94	566 66	635 38	571 30	575.33	626 24	599.35	573 17

Table 4.16. ANOVA for the data on weekly average body weight of broilers (g) contained in Table 4.15.

Source of variation	d.f	s s	M S.S	F Value			
				Cal	Table (5%)	Result	
Treatments	8	101994 59	12749.32	34 22	2 18	S	22.51
Replications	5	8738726 48	1747745 29	4692 05	2 45	S	22 51
Error	40	14899 99	372.49				
Total	53	8825821 08					

S = Significant

Weekly mean body weight of broilers (g) in treatments

Treatments

T_4	T_7	T_8	T_6	T_5	T_3	T_0	T_1	T_2
635.38	626.24	599.35	575.33	571.30	566.65	559.94	537.47	486.94

Week wise- mean body weight of broilers (g)

W_6	W_5	W_4	W_3	W_2	W_1
1212.21	949.06	616.40	359.40	203.79	98.20

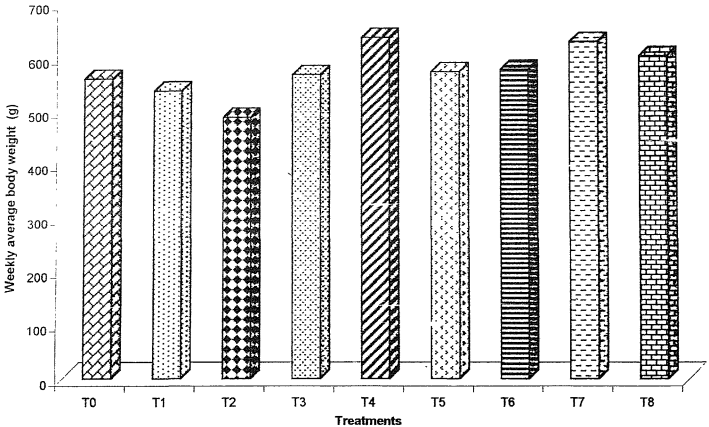


Figure 4.1. Weekly average body weight (g) of broilers in different treatments

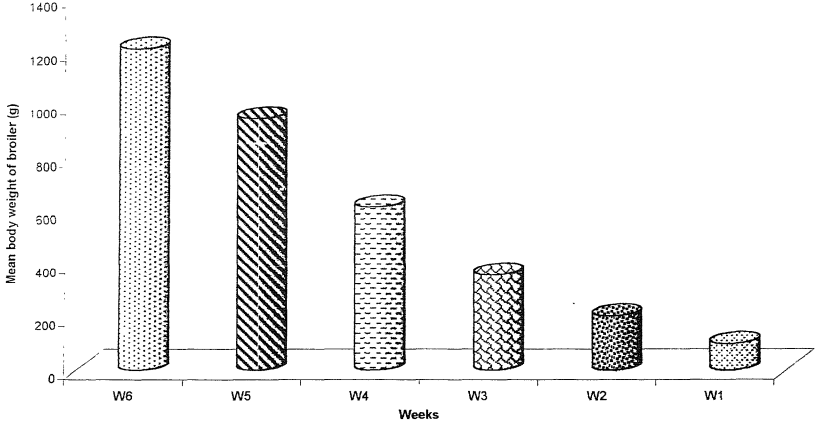


Figure 4.2. Week-wise mean body weight of broilers (g) in different treatments

4.2 WEIGHT GAIN OF BROILERS (G):

The data on weight gain of broilers are furnished in Table 4.17 to 4 30

4.2.1 Weight gain in broilers during first week of age:

The data regarding weight gain of broilers in different treatments, viz. T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 are presented in Table 4.17 and ANOVA of the. same is given in Table 4 18. The following observations were made·

1. In general, weight gain of broilers during first week of age ranged from 3576 g, (mean 58.77 g).
2. The weight gain in broilers in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 ranged from 48-66, 35-76, 40-58, 52-66, 46-73, 51-74, 43-76, 38-71 and 49-72 g, respectively
3. The mean weight gain in broilers in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 during first week of age was 58.66, 60.33, 50 0, 60.66, 61.0, 58.16, 60.66, 60.16 and 59.33 g, respectively.
4. The differences in weight gain of broilers between treatments were non significant (Table-4.18)

From the data furnished in Table-4.17 it may be noted that broilers of T_4 registered highest weight gain (61.0g) followed by broilers in T_6 (60.66 g), T_3 (60.66g), T_1 (60.33g), T_7 (60.16g), T_8 (59.33g), T_0 (58.66g), T_5 (58.16g) and T_2 (50.0g). Since differences in weight gain of broilers were found non-significant, it indicated a non-significant effect of treatments on weight gain of broilers which showed that all test rations were at par.

Table 4.17. Weight gain (g) in broilers during first week of age in different treatments.

Replications	Treatments Weight gain (g) in broilers during first week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	65	71	48	65	73	51	75	71	57	64 11
2.	66	69	40	57	46	57	66	38	72	56 77
3	53	57	51	66	61	52	62	66	49	57 55
4.	58	76	48	62	58	57	54	61	63	59 66
5.	48	54	55	52	55	58	62	66	64	57.11
6.	62	35	58	62	73	74	43	59	51	57 44
Mean	58.66	60.33	50 0	60 66	61	58 16	60 66	60 16	59 33	58 77

Table 4.18. ANOVA for the data on weight gain (g) in broilers during first week of age in different treatments contained in Table 4.17.

Source of variation	d.f	s s	M.S S	F Value		Result
				Cal	Table (5%)	
Treatments	8	565 0	70 62	0 698	2 18	NS
Replications	5	353.56	70 71	0 698	2 45	NS
Error	40	4046.78	101 16			
Total	53	4965 34				

NS = Non-Significant

Mean weight gain in broilers in first week of age (g)

Treatments

T_4	T_6	T_3	T_1	T_7	T_8	T_0	T_5	T_2
61.0	60.56	60.66	60 33	60.16	59.33	58 66	58. 16	50.0

4.2.2 weight gain of broilers (g) during second week of age:

The data regarding weight gain of broilers in treatments are presented in Table-4.19 and ANOVA of the same is given in Table-4 20, the following observations were made

1. In general, weight gain in broilers during second week of age ranged from 34-170 g (mean 105 58g).
2. The weight gain of broilers in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 ranged from 62-122, 67-170, 34-140, 62-120, 70-165, 91-131, 78-148, 111-121 and 68-154 g, respectively.
3. The mean weight gain of broilers of T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 during second week of age was 97 16, 111.0, 90.16, 93.33, 121.66, 108.33, 111 33, 116 33 and 101.0 g, respectively.
4. The differences in weight gain of broilers between treatments were non-significant (Table-4.20)

From the data furnished in Table-4.19, it was noted that broilers of T_4 registered highest weight gain (121 66g) followed by the broilers in T_7 (116.33g), T_6 (111.33g), T_1 (111.0g), T_5 (108.33g), T_8 (101.0g), T_0 (97.16g), T_3 (93.33g) and T_2 (90.16g). Since differences in these values of weight gain of broilers were found non-significant it indicated non-significant effect of treatments on weight gain of broilers

Table 4.19. **Weight gain (g) in broilers during second week of age in different treatments.**

Replications	Treatments Weight gain (g) in broilers during second week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	122	126	80	120	165	106	148	111	111	108 77
2	112	106	97	107	125	91	119	115	154	114 0
3	85	105	98	101	70	103	94	115	86	95 22
4	112	170	140	66	105	123	112	121	68	113 0
5	90	67	34	104	149	96	117	117	98	68 88
6.	62	92	92	62	116	131	78	119	89	93 44
Mean	97 16	111 0	90 16	93 33	121 66	108 33	111 33	116 33	101 0	105 58

Table 4.20. **ANOVA for the data on weight gain (g) in broilers during second week of age in different treatments contained in Table 4.19.**

Source of variation	d.f	s s	M S S	F. Value		Result
				Cal.	Table (5%)	
Treatments	8	5542.70	692 83	1 10	2.18	NS
Replications	5	6244.37	1248.87	1.99	2.45	NS
Error	40	25079.97	626 99			
Total	53	36887 04				

NS = Non-Significant

Mean weight gain in broilers in second week of age (g)

Treatments

T_4	T_7	T_6	T_1	T_5	T_8	T_0	T_3	T_2
121 66	116 33	111.33	111 0	108 33	101.0	97 16	93.33	90 16

4.2.3 weight gain of broilers (g) during third week of age.

The data regarding weight gain of broilers (g) in different treatments are presented in Table-4.21 and ANOVA of the same is given in Table 4.22 The following observations were made:

In general, weight gain in broilers during third week of age ranged from 46-230g.

1. The weight gain of broilers in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 ranged from 104-209, 46-170, 97-179, 63-204, 152-230, 140-202, 135-209, 154-200 and 105-223 g, respectively.
2. The mean weight gain of broilers of T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 during third weed of age was 158 0, 124.33, 135.0, 140.0 191.33, 161.83, 165.83, 181.5 and 161.33 g, respectively.
3. The overall mean weight gain of broilers, irrespective of treatment, during third week of age was 157.68 g.
4. The differences in weight gain of broilers due to treatments were non-significant (Table-4 22)

The perusal of data on weight gain of broilers in Table-4.21 indicated that highest mean weight gain in broilers was recorded in T_4 (191.33g) followed by T_7 (181.5g), T_6 (165.83g), T_5 (161.83g), T_8 (161.33g), T_0 (158.0g), T_3 (140.0g), T_2 (135.0g) and T_1 (124.33g). The differences in these values were found nonsignificant

Table 4.21. Weight gain (g) in broilers during third week of age in different treatments.

Replications	Treatments Weight gain (g) in broilers during third week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	150	170	97	127	230	152	209	154	166	161 66
2.	209	147	123	63	178	144	193	200	223	164 44
3.	179	139	142	182	152	154	156	187	180	163.44
4.	167	46	179	204	181	202	140	186	105	156 66
5.	139	94	150	135	185	140	162	182	148	148 33
6.	104	150	119	129	222	179	135	180	146	151.5
Mean	158.0	124.33	135 0	140 0	191 33	161 33	165.83	181.5	161.33	157 65

Table 4.22. ANOVA for the data on weight gain (g) in broilers during third week of age in different treatments contained in Table 4.21.

Source of variation	d f	s s	M.S S	F. Value		Result
				Cal.	Table (5%)	
Treatments	8	22416 48	2802 06	2.17	2.16	NS
Replication	5	1986.98	397 39	0 308	2.45	NS
Error	40	51574 19	1289.35			
Total	53	75977 65				

NS = Non-Significant

Mean weight gain in broilers in third week of age (g)

Treatments

T_4	T_7	T_6	T_5	T_8	T_0	T_3	T_2	T_1
191.33	181.5	165.83	161.83	161.33	158.0	140.0	135.0	124.33

4.2.4 Weight gain of broilers (g) during fourth week of age.

The data regarding weight gain of broilers during fourth week of age in different treatments in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 are presented in Table-4.23 and ANOVA of the same is given in Table-4.24. The following observations were made

1. In general, weight gain in broilers during fourth week of age ranged from 107-405 g.
2. The weight gain of broilers in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 ranged from 107-385, 178-258, 143-253, 195-380, 208-343, 210-290, 196-390, 198-405 and 233-310 g, respectively.
3. The mean weight gain of broilers of T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 during fourth weeks of age was 278.83, 230.16 205-50, 276.33, 283.33, 247.16, 258.33, 267.16 and 266.16 g, respectively.
4. The overall mean weight gain of broilers, irrespective of treatments, during fourth week of age was 256.99 g.
5. The differences in weight gain of broilers due to treatments were non significant (Table-4.24).

The perusal of the data on weight gain of broilers in Table-4.24, it was noted that broilers of T_4 registered highest weight gain (283.33g) followed by the broilers in T_0 (278.83g), T_3 (276.33g), T_7 (267.16g), T_8 (266.16g). T_6 (258.33g), T_5 (247.16g), T_1 (230.16g), T_2 (205.50g). Since differences in these values of weight gain were found non-significant indicating, a non-significant effect of treatments on he weight gain of broilers of different treatments.

Table 4.23. Weight gain (g) in broilers during fourth week of age in different treatments.

Replications	Treatments Weight gain (g) in broilers during fourth week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	385	220	143	380	313	233	390	405	235	300.44
2.	342	248	172	357	296	210	252	245	310	270.22
3.	325	233	220	263	208	250	216	223	304	249.11
4.	255	244	240	256	303	290	248	198	233	251.88
5.	259	178	253	195	343	234	248	278	272	251 11
6.	107	158	205	207	237	266	196	254	243	226.22
Mean	278.83	230.16	205.50	276 33	283 33	247 16	258 33	267.16	266.16	256 99

Table 4.24. ANOVA for the data on weight gain (g) in broilers during fourth week of age in different treatments contained in Table 4.23.

Source of variation	d f	s s	M S.S	F Value		Result
				Cal	Table (5%)	
Treatments	8	31212 33	3901.54	0.980	2.18	NS
Replications	5	3251 20	650 24	0.163	2 45	NS
Error	40	159238 47	3980 96			
Total	53	193702 0				

NS = Non-Significant

Mean weight gain in broilers in fourth week of age (g)

Treatments

T_4	T_0	T_3	T_7	T_8	T_6	T_5	T_1	T_2
283.33	278.83	276.33	267.16	266.16	258.33	247.16	230.16	205.50

4.2.5 Weight gain of broilers (g) during fifth week of age:

The data regarding weight gain of broilers in treatments are presented in Table-4.25 and ANOVA of the same is given in Table-4.26. The following observations were made:

1. In general weight gain in broilers during fifth week of age ranged from 200 to 470 g
2. The weight gain of broilers in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 ranged from 200-440, 240-450, 200-380, 300-410, 250-440, 270-350, 250-330, 330-470 and 280-400 g, respectively.
3. The mean weight gain of broilers of T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 during fifth week of age was 346.66, 321.66, 286.66, 345.66, 356.66, 325.50, 281.66, 376.66 and 353.33 g, respectively.
4. The overall mean weight gain, of broilers, irrespective of treatment, during fifth week of age was 332.66 g.
5 The differences in weight gain of broilers due to treatments were non-significant (Table-4.26)

From the data furnished in Table-4.25, it was noted that broilers of T_7 registered highest weight gain (376.66g) followed by the broilers in T_4 (356.66g), T_8 (353.33g), T_0 (346.66g), T_3 (345.66g), T_5 (325.0g), T_1 (321.66g), T_2 (286.66g) and T_6 (281.66g). Since differences in these values of weight gain were found non-significant indicating a non-significant effect of treatments on weight gain of broilers. This showed a non-significant influence of test diets on growth of broilers.

Table 4.25. Weight gain (g) in broilers during fifth week of age in different treatments.

Replications	Treatments Weight gain (g) in broilers during fifth week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	440	450	200	410	390	270	260	470	400	365.55
2.	360	300	270	334	380	330	250	370	330	324.88
3	360	290	240	310	330	330	250	390	400	322.22
4.	340	240	350	300	350	350	320	330	290	317.77
5.	380	350	380	380	250	340	330	340	330	342.22
6.	200	300	280	340	440	330	280	360	380	323 33
Mean	346.66	321.66	286 66	345 66	356 66	325 0	281 66	376 66	353.66	332 66

Table 4.26. ANOVA for the data on weight gain (g) in broilers during fifth week of age in different treatments contained in Table 4.25.

Source of variation	d.f	s s	M.S S	F Value		Result
				Cal	Table (5%)	
Treatments	8	49205 33	6150.66	1.98	2 18	NS
Replications	5	14862 22	2972 44	0.960	2.45	NS
Error	40	123804 45	3095 11			
Total	53	187872.00				

NS = Non-Significant

Mean weight gain in broilers in fifth week of age (g)

Treatments								
T_7	T_4	T_8	T_0	T_3	T_5	T_1	T_2	T_6
376.66	356.66	353.33	364 66	345 66	325 0	321 66	286.66	281.66

4.2.6 Weight gain of broilers (g) during sixth week of age:

The data regarding weight gain of broilers in treatments are presented in Table-4.27 and ANOVA of the same is given in Table-4.28. The following observations were made.

1. In general weight gain in broilers during six weeks of age ranged from 110 to 470g.
2. The weight gain of broiler in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 ranged from 110-300, 180-350, 150-260, 110-320, 200-330, 230-300, 190-360, 170-470 and 280-450 g, respectively.
3. The mean weight gain of broilers of T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 during six weeks of age was 216.66, 241.66, 205.0, 245.0, 273.33, 270.00, 296.66, 295.0 and 341.66 g, respectively
4. The overall mean weight gain of broilers irrespective of treatments, during six weeks of age was 264.99 g.
5. The differences in weight gain of broilers between treatments were non-significant. (Table-4.28).

The perusal of data on weight gain of broilers in Table 4.27 indicated that highest mean weight gain in broilers was recorded in T_8 (341.66g) followed by T_6 (296.66g), T_7 (295.0g), T_4, (273.33g), T_8 (270.0g), T_3 (245.0g), T_1 (241.66 g), T_0 (216.66g) and T_2 (205.0g). The differences in these values were found nonsignificant indicating a non-significant effect of treatments on the weight gain of broilers.

Table 4.27. **Weight gain (g) in broilers during sixth week of age in different treatments.**

Replications	Treatments Weight gain (g) in broiler chicks during sixth week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	300	180	150	260	240	280	350	320	330	267 77
2.	220	280	260	330	290	300	350	250	280	284.44
3.	110	210	220	270	330	290	360	240	450	275.55
4.	190	250	170	270	250	230	280	470	290	266 66
5	200	350	230	230	330	230	250	170	380	263 33
6.	280	180	200	110	200	280	190	320	320	232 22
Mean	216.66	241.66	205 0	245.0	273 33	270 0	296 66	295.0	341 66	264.99

Table 4.28. **ANOVA for the data on weight gain (g) in broilers during sixth week of age in different treatments contained in Table 4.27.**

Source of variation	d.f	s s	M.S S	F Value		Result
				Cal.	Table (5%)	
Treatments	8	88533 33	11066.66	0 235	2.18	NS
Replications	5	14194.44	2838 88	0.625	2 45	NS
Error	40	181422.23	4535 55			
Total	53	284150.0				

NS = Non-Significant

Mean weight gain in broilers in sixth week of age (g)

Treatments

T_8	T_6	T_7	T_4	T_5	T_3	T_1	T_0	T_2
341.66	296.66	295.0	273.33	270.0	245.0	241.66	216 66	205.0

4.2.7 Weekly weight gain of broilers (g).

The data regarding weekly weight gain of broilers are presented in Table 4.29, Figure 4.3, 4 4 and ANOVA of the same is given in Table-4.30. The following observations were made:

1. Irrespective of treatment, the weight gain of broilers during first, second, third, fourth, fifth and sixth week of age ranged from 50.0 to 61.0, 90.16 to 121.66, 99.5 to 191.33, 205.5 to 283.33 and 281.66 to 376.66 g, respectively.
2. The weight gain of broilers during sixth week of age in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 216.66, 241.66, 205.0, 245 0, 240.16, 270.0, 296.66, 295.0 and 346.66 g, respectively.
3. The mean weekly weight gain of broilers in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 192.66, 177.38, 162.05, 193.49. 209.02, 195.06, 195.74, 216.13 and 214 63 g, respectively.
4. The differences in the weight gain of broilers were found non-significant (Table-4.30).

The perusal of the data on weekly weight gain of broilers contained in Table-4.29 showed that there was an increase in weight gain with increase in age of broilers. The highest weight gain was recorded in fifth week (332.66g) followed by sixth (261.86g), fourth (256.99g), third (154.92g), second (105.58g) and first week (58.77g) The differences between these values of weight gain were found significant. This indicated a significant effect of age on weight gain and it was as expected. However, the weight gain of broilers between second and third week was not

significantly different with regard to effect of treatments it was noted that the broilers of T_7 group registered highest mean weekly weight gain (216.13g) followed by T_8 (214.63), T_4 (195.74g), T_5 (195.08g), T_3 (193.49g), T_0 (196.66g), T_1 (177.38g) and T_2 (162.05g). However, the differences between these values of weekly weight gain were found non-significant, which indicated a non-significant effect of treatments on weekly weight gain of broilers.

Table 4.29. Weekly average weight gain (g) in broilers of different treatments.

Weeks	Treatments Weekly average weight gain [g] of broilers									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	58.66	60.33	50.0	60.66	61 0	58 16	60 66	60 16	59.33	58 77
2.	97 16	111 0	90.16	93 33	121 66	108 33	111 33	116 33	101.0	105 58
3.	158 0	99 5	135.0	140 0	191 33	161 83	165 83	181.5	161.33	154 92
4.	278.83	230.16	205 5	276 33	283 33	247 16	258.33	267 16	266.16	256.99
5.	246.66	321 66	286 66	345.66	356 66	325.0	281.66	376.66	353 33	332.66
6.	216.66	241.66	205.0	245.0	240.16	270.0	296.66	295 0	346 66	261 86
Mean	192.66	177.38	162 05	193 49	209 02	195 08	195 74	216 13	214.63	195 13

Table 4.30. ANOVA for the data on weekly average weight gain (g) in broilers contained in Table 4.29.

Source of variation	d.f	s.s	M S S	F. Value		Result	C D
				Cal	Table (5%)		
Treatments	8	12527.89	1565 98	0.819	2.18	NS	-
Replications	5	498931 01	99786 20	52 24	2.45	S	50.99
Error	40	76395 42	1909 88				
Total	53	587854 32					

S = Significant NS = Non-Significant

Weekly mean weight gain in broilers (g) in treatments

Treatments								
T_7	T_8	T_4	T_6	T_5	T_3	T_2	T_1	T_2
216.13	214.63	209.02	195.74	195.08	193.49	192.66	177.38	162.05

Week wise- mean weight gain in broilers (g)

W_6	W_5	W_4	W_3	W_2	W_1
332.66	261.86	256.99	154.92	105.58	58.77

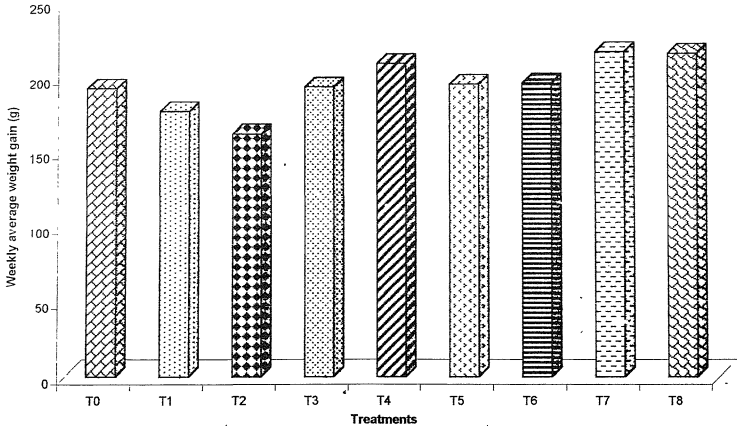


Figure 4.3. Weekly average weight gain (g) of broilers in different treatments

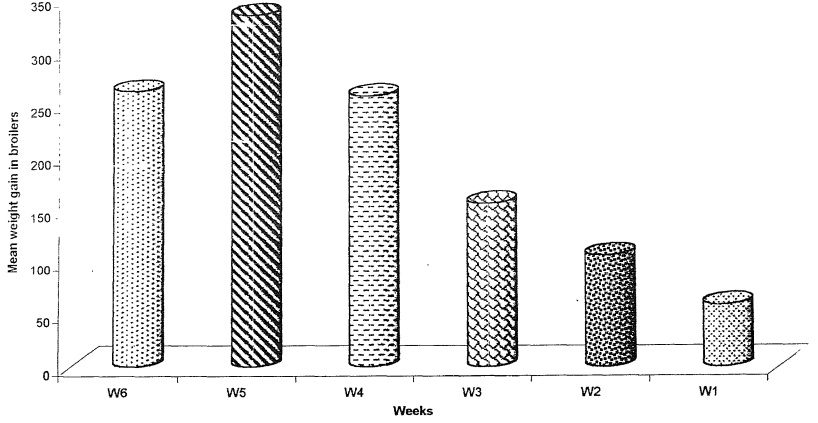


Figure 4.4. Week-wise mean weight gain in broilers (g) in different treatments

4.3 FEED CONSUMPTION OF BROILERS:

The data regarding feed consumption in broilers of treatments T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 are presented in Table 4.31 to 4.44

4.3.1 Feed consumption of broiler(g) during first week of age:

The data regarding average feed consumption of broilers during first week of age are presented in Table-4 31 and ANOVA of the same is given in Table-4.32. The following observations were made:

1. Irrespective of treatments in general, the average feed consumption of broilers in first week of age ranged from 71.0 to 176.33 g.
2. The mean feed consumption of broilers during first week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 151.99, 148.66, 112.0, 139.16, 141.33, 111.33, 124.99, 108.33 and 87.5 g, respectively.
3. The overall mean feed consumption of broilers irrespective of treatment, during first week of age was 125.03 g.
4. The difference in feed consumption of broilers irrespective of treatment, duringfirst week of age between the treatments were significant (Table-4.32)

From the data on feed consumption of broilers (g) during first week contained in Table-4.31, it may be noted that the highest mean feed consumption of broilers during first week of age was recorded in T_0 (151.99g) followed by T_1 (148.66g), T_4 (141.33g), T_3 (139.16g), T_6 (124.99g), T_2 (112,0g), T_5 (111.33g), T_7 (108.33g) and T_8 (87.5g). The differences in these values were found to be significant, indicating a significant effect of treatments on the feed consumption of broilers. The

broilers of T_0 group registered significantly higher feed consumption than the broilers of T_2, T_5, T_7 and T_8 groups. However, the differences between the feed consumption of T_0, T_1, T_4, T_3 and T_6 were non-significant, being at par. The broilers of T_8 group registered significantly less feed consumption than T_0, T_1, T_4, T_3 and T_6 group. However, the differences between T_2, T_5 T_7 and T_8 were non-significant. Similarly no significant differences was observed in feed consumption of broilers between T_1, T_2 T_3, T_4, T_5, T_6 and T_7. The broilers of T_1,T_2, T_3 T_4 and T_6 group also registered non-significant differences in feed consumption

Table 4.31. Average feed consumption of broilers (g) during first week of age in different treatments.

Replications	Treatments									
	Feed consumption in broilers in treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1	176 33	139.0	105.0	134 33	149 33	113.33	116 66	106 66	71 0	123.51
2.	127.66	158 33	119 0	144 0	133 33	109.33	133 33	111.0	104.0	126 66
Mean	51.99	148 66	112.0	139 16	141 33	111 33	124,99	108.33	87 5	125 03

Table 4.32. ANOVA for the data on average feed consumption of boilers (g) during first week of age contained in Table 4.31.

Source of variation	d f	s.s	M S S	F. Value		Result	C.D
				Cal.	Table (5%)		
Treatments	8	7531 68	941 46	3 91	2 55	S	35.77
Replication	1	310 33	310 33	1 28	4 45	NS	
Error	8	1925 11	240 63				
Total	17	9456 79					

S= Significant NS=Non-Significant

Mean feed consumption of broilers in first week of age (g).

Treatments

T_0	T_1	T_4	T_3	T_6	T_2	T_5	T_7	T_8
151.99	148 66	141.33	139 16	124 99	112.0	111.33	108.33	87.05

4.3.2 Average feed consumption of broiler (g) during second week of age.

The data regarding average feed consumption of broilers during second week of a-ge are presented in Table-4.33 and ANOVA of the same is given in Table-4.34. The following observations were made.

1. Irrespective of treatment, in general, the average feed consumption of broilers in second week of age ranged from 133.33-317.0 g.
2. The mean feed consumption of broilers during second week in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 283.0, 191.33, 221.33, 212.5, 220.33, 208.66, 193.33, 214.49 and 224.0 g, respectively.
3. The overall mean feed consumption of broiler during second week of age was 218.77g.
4. The differences in feed consumption during second week were non-significant. (Table-34).

From the data on feed consumption of broilers contained in Table-4.33, it may be noted that the highest mean feed consumption per broiler, during second week of age was recorded in T_0 (283.0g) followed byT_8 (224.0g), T_2 (221.33g), T_4 (220.33g), T_7 (214.49g), T_3 (212.5g), T_5 (208.66), T_6 (193.33g) and T_1 (1 91.33g). The differences in these values of feed consumption were found non-significant indicating, thereby a non-significant effect of treatments on the feed consumption of broilers.

Table 4.33. Average feed consumption of broilers (g) during second week of age in different treatments.

Replications	Treatments Feed consumption in broilers in different treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	317.0	249 33	258 33	229 0	214 0	240 0	226.66	213.33	249 0	244.07
2.	249 0	133.33	184 33	196 0	226 66	177 33	160 0	215 66	199 0	193 47
Mean	283.0	191 33	221 33	212 5	220 33	208 66	193 33	214 49	224 0	218 77

Table 4.34. ANOVA for the data on average feed consumption of boilers (g) during second week of age contained in Table 4.33.

Source of variation	d.f	s s	M S S	F Value		Result	C D
				Cal.	Table (5%)		
Treatments	8	11443.34	1430 41	0.64	2 55	NS	
Replication	1	11518 58	11518 58	5.16	4 45	S	108.89
Error	8	17840 85	2230 10				
Total	17	40802 77					

S= Significant NS=Non-Significant

Mean feed consumption of broilers in second week of age (g).

Treatments

T_0	T_8	T_2	T_4	T_7	T_3	T_5	T_6	T_1
283.0	224.0	221.33	220.33	214.49	212.5	208.66	193.33	191.33

4.3.3 Average feed consumption of broilers (g) during third week of age:

The data regarding average feed consumption in broilers of different treatments during third week of age are presented in Table-4.35 and ANOVA of the same is given in Table-4.36. The following observations were made:

1. Irrespective of treatment, the average feed consumption of broilers in third week of age ranged from 113.33 to 520.0g.
2. The mean feed consumption of broilers during third week in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 366.66, 216.66, 170.33, 189.99, 263.33, 224.99, 256.66, 309.99 and 196.66 g, respectively.
3. The overall mean feed consumption of broiler irrespective of treatment, during third week of age was 244.80 g.
4. The differences in feed consumption of broiler during third week between the treatments were non-significant (Table-4.36).

From the data on treatment-wise feed consumption of broilers contained in Table-4.35, it may be noted that the highest mean feed consumption of broilers during third week of age was in T_0 (366.66g) followed by T_7 (309.99g), T_4 (263.33g), T_6 (256.66g), T_5 (224.99g), T_1 (216,66g), T_8 (196.66g), T_3 (189-99g) and T_2 (178.33g). The differences in these values of feed consumption in broilers during third week were found non-significant, indicating thereby a non-significant effect of treatments on the feed consumption of broilers.

Table 4.35. Average feed consumption of broilers (g) during third week of age in different treatments.

Replications	Treatments									
	Feed consumption in broilers in treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	213.33	213 33	156 66	253 33	286 66	216.66	273 33	313 33	280.0	245 18
2.	520.0	220.0	200.0	126 66	240 0	233 33	240.0	306.66	113.33	244.44
Mean	366.66	216 66	178.33	189 99	263 33	224.99	256 66	309 99	196.66	244.80

Table 4.36. ANOVA for the data on average feed consumption of boilers (g) during third week of age contained in Table 4.35.

Source of variation	d.f	s s	M S S	F Value		Result
				Cal.	Table (5%)	
Treatments	8	61017 03	7627 12	0 850	2 55	NS
Replications	1	3.0	3 0	0 0003	4.45	NS
Error	8	71701 98	8962.74			
Total	17	132722 01				

NS=Non-Significant

Mean feed consumption of broilers in third week of age (g).

Treatments								
T_0	T_7	T_4	T_6	T_5	T_1	T_8	T_3	T_2
366.66	309.99	263.33	256 66	224.99	216.66	196.66	189.99	178.33

4.3.4. Average feed consumption of broilers (g) during fourth week of age:

The data regarding average feed consumption in broilers during fourth week of age are presented in Table-4.37 and ANOVA of the same is given in Table-4.38. The following observations were made:

1. Irrespective of treatment, in general the average feed consumption of broilers in fourth week of age ranged from 220.0-626.66 g.
2. The mean feed consumption of broilers during fourth week in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 501.66, 391.66, 379 99, 438.33, 431.66, 335.0, 496 66, 431.66 and 506.66 g, respectively.
3. The overall mean feed consumption of broiler irrespectively at treatment during fourth week of age was 434.80 g.
4. The differences in feed consumption of broiler during fourth week of age between the treatment were non-significant (Table-4.38).

From the data on feed consumption of broilers contained in Table-4.37 it was observed that highest mean feed consumption of broilers during fourth week of age was recorded in T_8 (506.66g) followed by T_0 (501.66g), T_6 (496.66g), T_3 (438.33g), T_4 (431.66g), T_7 (431.66g), T_1 (391.66g), T_2 (379.99g) and T_5 (335.0g). The differences in these values of feed consumption in broilers during fourth week were found non-significant, indicating thereby a non-significant effect of feed consumption of broilers. These results showed that non-significant influence of test diets on feed consumption of broiler was similar.

Table 4.37. Average feed consumption of broilers (g) during fourth week of age in different treatments.

Replications	Treatments Feed consumption in broilers in treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	626 66	363 33	363 33	493.33	356 66	220.0	446 63	463 33	463.33	421.84
2.	376.66	420.0	396 66	383.33	506 66	450 0	546.66	400.0	550.0	435.55
Mean	501.66	391 66	379 99	438 33	431 66	335 0	496 66	431 66	506 66	434 80

Table 4.38. ANOVA for the data on average feed consumption of boilers (g) during fourth week of age contained in Table 4.37.

Source of variation	d.f	s.s	M.S S	F. Value		Result
				Cal.	Table (5%)	
Treatments	8	56635.79	7079.47	0.644	2.55	NS
Replications	1	3084.87	3084.87	0 280	4.45	NS
Error	8	87922.40	10990.30			
Total	17	147643 06				

NS=Non-Significant

Mean feed consumption of broilers in fourth week of age (g).

Treatments								
T_8	T_0	T_6	T_3	T_4	T_7	T_1	T_2	T_5
506.66	501.66	496.66	438.33	431.66	431 66	391.66	374.99	335 0

4.3.5 Average feed consumption of broilers (g) during fifth week of age:

The data regarding average feed consumption in broiler during fifth week of age are presented in Table-4.39 and ANOVA of the same is given in Table-4.40. The following observations were made:

1. Irrespective of treatment, in general, the average feed consumption of broilers in fifth week of age ranged from 400.0 to 833.33g.
2. The mean feed consumption of broilers during fifth week in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 719.99, 588.33, 458.33, 475.0, 651.66, 643.33, 666.66, 674.99 and 654.99 g, respectively.
3. The overall feed consumption of broiler irrespective of treatment during fifth week of age was 614.80g.
4. The differences in feed consumption of broilers during fifth week between the treatments were non-significant (Table-4.40).

From the treatment-wise data on feed consumption of broilers (g) contained in Table-4.39 it may be noted that the highest mean feed consumption of broilers during fifth week of age was recorded in T_0 (719.99g) followed by T_7 (674.99g), T_6 (666.66g), T_8 (654.99g), T_4 (651.33g), T_5 (643.33g), T_1 (588.33g), T_3 (475.0g) and T_2 (458.33g). The differences in these values of feed consumption of broilers during fifth week were found non-significant, indicating thereby a non-significant effect of treatments of test rations on the feed consumption in broilers.

Table 4.39. Average feed consumption of broilers (g) during fifth week of age in different treatments.

Replications	Treatments Feed consumption of broilers in treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	833.33	610.0	463 33	400 0	660 0	623.33	666 66	776.66	723 33	639 62
2.	606.66	566 66	453.33	550.0	643.33	663 33	666.66	573.33	586.66	589.99
Mean	719.99	588.33	458 33	475.0	651 66	643.33	666.66	674.99	654.99	614.80

Table 4.40. ANOVA for the data on average feed consumption of broilers (g) during fifth week of age contained in Table 4.39.

Source of variation	d.f	s s	M.S S	F. Value		Result
				Cal.	Table (5%)	
Treatments	8	131790.14	16473 76	1 :)1	2.55	NS
Replications	1	11084.61	11084 61	1.28	4.45	NS
Error	8	68878.56	8609.82			
Total	17	211753.31				

NS=Non-Significant

Mean feed consumption of broilers in fifth week of age (g).

Treatments

T_0	T_7	T_6	T_8	T_4	T_5	T_1	T_3	T_2
719.99	674.99	666.66	654.99	651.66	643.33	588.33	475.0	458.33

4.3.6 Average feed consumption of broilers (g) during sixth week of age.

The data regarding average feed consumption in broiler during sixth week of age are presented in Table-4.41 and ANOVA of the same is given in Table-4.42. The following observations were made:

1. Irrespective of treatment, the average feed consumption of broilers in sixth week of age ranged from 363.33 to 896,66g.
2. The mean feed consumption of broilers during sixth week in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 473.33, 670.0, 536.66, 716.66, 766.66, 713.33, 544.99, 591.66 and 833.33 g, respectively.
3. The overall feed consumption of broiler irrespective of treatment, during sixth week of age was 649.62 g.
4. The differences in feed consumption of broilers during sixth week between the treatments were non-significant (Table-4.42).

From the perusal of data on feed consumption of broilers in sixth week of age furnished in Table-4.41, it may be noted that in general feed consumption of broilers ranged from 363.33 to 896.66g. However, highest feed consumption was recorded in T_8 (833.33g), followed by T_4 (766.66g), T_3 (716.66g), T_5 (713.33g), T_1 (670.0g), T_7 (591.66g), T_6 (544.99g), T_2 (536.66g) and T_0 (473.33g). Since differences in these values of feed consumption between the treatmnets were found non-significant, indicating non-significant effect of treatments on the feed consumption of broilers during sixth week of age.

Table 4.41. Average feed consumption of broilers (g) during sixth week of age in different treatments.

Replications	Treatments Feed consumption in broilers in treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	363.33	680.0	473.33	800 0	766.66	656 66	436 66	740 0	896 66	645 92
2.	583 33	660.0	600 0	633 33	766.66	770.0	653 33	443.33	770 0	653 33
Mean	473 33	670.0	536 66	716.66	766.66	713.33	544 99	591 99	833 33	649.62

Table 4.42. ANOVA for the data on average feed consumption of boilers (g) during sixth week of age contained in Table 4.41.

Source of variation	d.f	s.s	M.S.S	F. Value		Result
				Cal.	Table (5%)	
Treatments	8	231503 57	28937.94	1.80	2.55	NS
Replications	1	326.66	326.66	0.020	4.45	NS
Error	8	128285 92	16035.74			
Total	17	360116.15				

NS=Non-Significant

Mean feed consumption of broilers in sixth week of age (g).

Treatments								
T_8	T_4	T_3	T_5	T_1	T_7	T_6	T_2	T_0
833.33	766.66	716.66	713.33	670.0	591.66	544.99	536.66	473.33

4.3.7 Average weekly feed consumption of broilers (g):

The data regarding average weekly feed consumption of broilers in different treatments are presented in Table-4.43 and ANOVA of the same is given in Table-4.44. The following observations were made:

1. Irrespective of treatment, in general, the average feed consumption of broilers during first, second, third, fourth, fifth and sixth week of age ranged from 87.66-152.0, 191.33-283.0, 178.33-366.66, 335.0-506.66, 458.33-745.0 and 473.33-833.33 g, respectively.
2. The mean feed consumption per broiler, irrespective of treatment in first, second, third, fourth, fifth and sixth week of age was 125.10, 218.77, 244.81, 434.81, 617.59 and 650.18 g, respectively.
3. The average feed consumption of broilers during sixth week of age in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 473.33, 670.0, 536.66, 716.66, 771-66, 713,33, 545.0, 591.66 and 833.33 g, respectively,
4. The mean weekly feed consumption of broilers in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 420.27, 367.77, 314.44, 361.94, 413.32, 372.77, 380.55, 388-60 and 417.21 g, respectively.
5. The differences in weekly average feed consumption of broilers between weeks were significant (Table-4.44).

From the perusal of data on treatment-wise weekly average feed consumption in broiler contained in Table-4.43 and Figure 4.5, 4.6, it may be noted that highest feed consumption of broilers irrespective of treatment, was recorded during sixth week (650.18g) followed by fifth (617.59g), fourth (434.81g), third (244.81g), second (218.77g) and first

week (125.10g). The differences in these values were found significant, indicating thereby a significant effect of age on feed consumption per broiler. These results were as expected because of increased requirement and consequently feed intake with increase with the age of broilers. The broilers during first week registered significantly lowest feed consumption than the broilers of second, third, fourth, fifth and sixth week. However, the differences between the feed consumption of broiler between second and third week and between fifth and sixth week were non-significant being at par. As far the effect of treatment on feed consumption on broilers is concerned, the highest average weekly feed consumption of broilers was recorded in T_0 (420.27g) followed by T_8 (417.2ç), T_4 (413.32g), T_7 (388.60g), T_6 (380.55g), T_5 (372.77g), T_1 (367.77g), T_3 (361.94 g) and T_2 (314.44g) but the differences in these values were found non-significant indicating, thereby a nonsignificant effect of treatments on weekly feed consumption of broilers.

Table 4.43. Weekly average feed consumption of broilers (g) in different treatments.

Replications	Treatments Feed consumption (g) per broilers in different treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	152.0	148.66	112 0	139.16	141 33	111 33	125 0	108.83	87.06	125.10
2.	283.0	191.33	221 33	212 5	220.33	208.66	193.33	214.5	224.0	218.7
3.	366.66	216.66	178 33	190.0	263.33	225.0	256.66	310.0	196.66	244 81
4.	501.66	391.66	380 0	438.33	431 66	335.0	496.66	431 66	506 66	434.81
5.	745.0	588.33	458 33	475.0	651.66	643.33	666.66	675 0	655 0	617.59
6.	473.33	670.0	536.66	716.66	771.66	713.33	545.0	591.66	833 33	650.18
Mean	420.27	367.77	314.44	361.94	413 32	372.77	380.55	388.60	417.21	381.87

Table 4.44. ANOVA for the data on average weekly feed consumption of broilers (g) contained in Table 4.43.

Source of variation	d.f	s s	M.S.S	F. Value		Result	C D
				Cal.	Table (5%)		
Treatments	8	53895.29	6736.91	1.33	2.18	NS	
Replications	5	217496.25	434993.45	86.18	2.45	S	82 89
Error	40	201882.76	5047 06				
Total	53	473274 3					

S= Significant NS=Non-Significant

Mean feed consumption of broilers (g) in treatments

Treatments								
T_0	T_8	T_4	T_7	T_4	T_6	T_1	T_3	T_2
420.87	417.21	413.32	388.60	380.55	372.77	367.77	361.94	314 44

Week-wise feed consumption of broilers (g

W_6	W_5	W_4	W_3	W_2	W_1
550.18	617.81	434.81	244.81	218.77	125.10

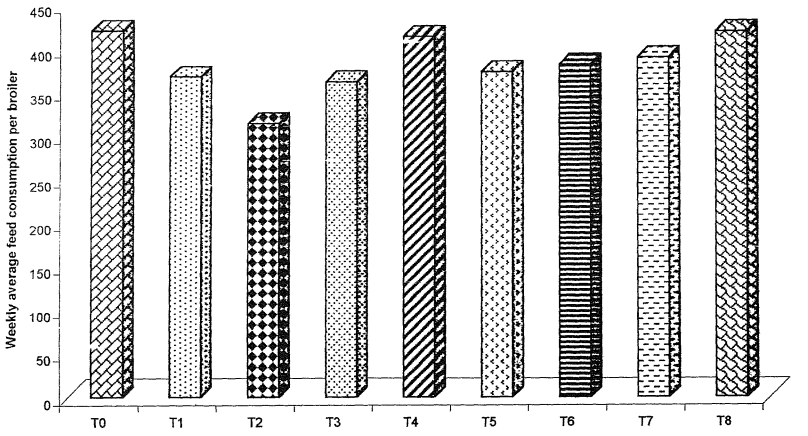


Figure 4.5. Weekly average feed consumption (g) of broilers in different treatments

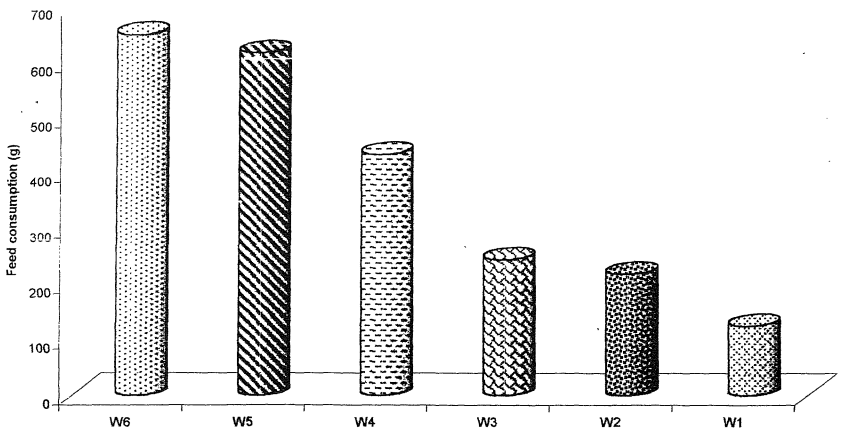


Figure 4.6. Week-wise mean feed consumption (g) of broilers in different treatments

4.4 FEED CONVERSION RATIO (F.C.R.) OF BROILERS:

It is the kg feed required for one kg of weight gain of broiler. Data regarding feed conversion ratio (F.C.R.) in broilers of different treatments (T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8) are furnished in Table-4.45 to 4.58.

4.4.1 Feed conversion ratio in broilers (kg) during first week of age:

The data regarding average feed conversion ration in broilers during first week of age are presented in Table-4.45 and ANOVA of the same is given in Table-4.46. The following observations were made:

1. Irrespective of treatment in general, the average feed conversion ratioper broiler during first week ranged from 1.) to 4.5.
2. The mean feed conversion ratio of broilers during first week in treatments T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 2.58, 2.63, 2.25. 2.30, 2.35, 1.95, 2.13, 1.88 and 1.46, respectively.
3. The overall mean feed conversion ratio during first week, irrespective of treatment, was 2.17.
4. The differences in the feed conversion ratio of broilers during first week between treatment were significant (Table-4.46).

From the perusal of the data contained in Table-4.45 it may be noted that the highest mean feed conversion ratio of broilers during first week of age was recorded in T_1 (2.63 kg) followed by T_0 (2.58 kg), T_4 (2.35

kg), T_3 (2.30 kg), T_2 (2.25 kg), T_6, (2.13 kg), T_5 (1.95 kg), T_7 (1.88 kg) and T_8 (1.46 kg). The differences in feed conversion ratio of broilers during first week of age between the treatments were found significant, indicating thereby a significant effect of treatments on the feed conversion ratio of broilers. The broilers of T_8 group registered significantly less F.C.R. than the broilers of T_0, T_1, T_2, T_3, T_4 and T_6. However, the differences in F.C.R. of broilers of T_8, T_7 and T_5 were non-significant being at par. Similarly, the differences in feed conversion ratio of broilers of T_0, T_1, T_2, T_3, T_4 and T_6 were also found non-significant being at par. The broilers of T_2, T_3, T_4, T_5, T_6 and T_7 group also registered the non-significant differences in feed efficiency.

Table 4.45. Feed conversion ratio (kg) of broilers during first week of age in different treatments.

Replications	Treatments Feed conversion ratio of broilers in different treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	2.7	1.9	2.2	2.1	2.0	2.2	1.5	1.5	1.2	1.92
2.	2.7	2.0	2.6	2.3	3.2	2.0	1.8	2.8	1.0	2.26
3.	3.3	2.4	2.0	2.0	2.4	2.2	1.8	1.6	1.4	2.12
4.	2.2	2.1	2.5	2.3	2.3	1.9	2.5	1.8	1.6	2.13
5.	2.6	2.9	2.2	2.8	2.4	1.9	2.1	1.7	1.6	2.24
6.	2.0	4.5	2.0	2.3	1.8	1.5	3.1	1.9	2.0	2.34
Mean	2.58	2.63	2.25	2.30	2.35	1.95	2.13	1.88	1.46	2.17

Table 4.46. ANOVA for the data on feed conversion ratio (kg) of broilers during first week of age contained in Table 4.45.

Source of variation	d.f	s.s	M.S.S	F. Value		Result	C.D
				Cal.	Table (5%)		
Treatments	8	6.40	0.008	3.04	2.18	S	0.598
Replications	5	0.994	0.198	0.752	2.45	NS	-
Error	40	10.53	0.263				
Total	53	17.924					

S = Significant NS=Non-Significant

Mean feed conversion ratio of broilers in first week of age (kg).

Treatments								
T_1	T_0	T_4	T_3	T_2	T_6	T_5	T_7	T_8
2.63	2.58	2.35	2.30	2.25	2.13	1.95	1.88	1.46

4.4.2 Feed conversion ratio of broilers (kg) during second week of age:

The data regarding average feed conversion ratio in broilers during second week of age are presented in Table-4.47 and ANOVA of the same is given in Table-4.48. The following observations were made:

1. Irrespective of treatment in general, the average feed conversion ratioper broiler in second week of age ranged from 0.8 to 5.4.
2. The mean feed conversion ratio of broilers during second week in treatment T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 2.65, 1.81, 2.68, 2.40, 1.91, 1.95, 1.76, 1.81 and 2.30, respectively.
3. The overall mean F.C.R. of broilers during second week of age irrespective of treatment was 2.14.
4. The differences in feed conversion ratio of broilers during second week of age between treatments were non-significant (Table-4.48).

From the data contained in Table-4.47, it may be noted that the highest mean feed conversion ratio of broilers during second week of age was recorded in T_2 (2.68) followed by T_0 (2.65), T_3 (2.40), T_8 (2.30), T_5 (1.95), T_4 (1.91), T_7 (1.81), T_1 (1.81) and T_6 (1.76). The differences in feed conversion ratio of broilers during second week of age between treatments were non-significant indicating thereby a non-significant effect of treatments on the feed conversion ratio of broilers. It indicated that all treatments were at par with control (T_0).

Table 4.47. Feed conversion ratio (kg) of broilers during second week of age in different treatments.

Replications	Treatments Feed conversion ratio of broilers in different treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	2.6	2.0	2 7	1 9	1.3	2 3	1.5	1 9	2 2	2 04
2.	2.8	2.3	2.1	2 1	1.7	2 6	1.9	1 8	1.6	2.10
3.	3.7	2 4	2 6	2.3	3 0	2 3	2.4	1 8	2.9	2.60
4.	2.2	0.8	1 3	3.0	2.1	1 4	1.4	1 8	2 9	1.87
5.	2 6	2.0	5 4	1.9	1 5	1 8	1 4	1 8	2 0	2.26
6.	2.	1.4	2 0	3.2	1 9	1 3	2.0	1 8	2.2	1 97
Mean	2.65	1.81	2.68	2.40	1 91	1.95	1 76	1.81	2.30	2.14

Table 4.48. ANOVA for the data on feed conversion ratio (kg) of broilers during second week of age contained in Table 4.47.

Source of variation	d.f	s.s	M.S S	F. Value		Result
				Cal	Table (5%)	
Treatments	8	6.19	0.773	1 57	2.18	NS
ReplicationS	5	4.0	0.800	1 62	2.45	NS
Error	40	19.68	0 492			
Total	53	29.87				

NS=Non-Significant

Mean feed conversion ratio of broilers in second week of age (kg).

Treatments								
T_2	T_0	T_3	T_8	T_5	T_4	T_7	T_1	T_6
2.68	2.65	2.40	2.30	1.95	1.91	1.81	1.81	1.76

4.4.3 Feed conversion ratio (kg) of broilers during third week of age:

The data regarding average feed conversion ratio in broilers during third week of age are presented in Table-4.49 and ANOVA of the same is given in Table-4.50. The following observations were made:

1. Irrespective of treatment in general, the average feed conversion ratioper broiler in third week of age ranged from 0.6 to 4.8.
2. The mean feed conversion ratio of broilers during third week in treatment T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 2.56, 2.11, 1.25, 1.65, 1.40, 1.40, 1.04, 1.71 and 1. 18, respectively.
3. The overall mean F.C.R. of broilers during third week of age irrespective of treatment was 1.58.
4. The differences in feed conversion ratio of broilers during third week of age between treatments were non-significant (Table-4.50).

From the data on feed conversion ratioin Table-4.49, it may be noted that the highest mean feed conversion ratio of broilers during third week of age was recorded in T_0 (2.56) followed by T_1 (2.11), T_7 (1.7 1), T_3 (1.65), T_4 (1.40), T_5 (1.40), T_2 (1.25). T_8 (1.18) and T_6 (1.04). The differences in feed conversion ratio of broilers during third week between treatments were non-significant. The results showed that there was a non-significant effect of treatments on feed conversion ratio of broilers compared to control.

Table 4.49. Feed conversion ratio (kg) of broilers during third week of age in different treatments.

Replications	Treatments Feed conversion ratio of broilers in different treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	1.4	1.2	1 6	2.0	1.2	1 4	1 3	2 0	1.7	1 53
2.	1.0	1.4	1.3	4.0	1.6	1.5	1.4	1.6	1.2	1 56
3.	1.2	1 5	1.1	1 4	1 9	1.4	1.7	1.7	1.5	1.48
4.	3.1	4.8	1 1	0 6	1 3	1.1	1 7	1.6	1 1	1 82
5.	3.7	2.3	0 7	0.9	1 3	1 7	1.5	1.7	0.8	1 62
6.	5.0	1.5	1 7	1.0	1.1	1 3	1 8	1.7	0 8	1.76
Mean	2.56	2.11	1 25	1 65	1 40	1 40	1.04	1.71	1.18	1.58

Table 4.50. ANOVA for the data on feed conversion ratio (kg) of broilers during third week of age contained in Table 4.49.

Source of variation	d.f	s.s	M.S S	F. Value		Result
				Cal.	Table (5%)	
Treatments	8	9.43	1 17	1 46	2.18	NS
Replications	5	0.760	0.152	0.190	2.45	NS
Error	40	31 85	0.796			
Total	53	42.04				

NS=Non-Significant

Mean feed conversion ratio of broilers in third week of age (kg).

Treatments								
T_0	T_1	T_7	T_3	T_4	T_5	T_2	T_8	T_6
2.56	2.11	1 71	1 65	1.40	1.40	1.25	1.18	1.04

4.4.4 Feed conversion ration (kg) of broilers during fourth week of age:

The data regarding average feed conversion ratio in broilers during fourth week of age are presented in Table-4 51 and ANOVA of the same is given in Table-4 52 The following observations were made

1. Irrespective of treatment in general, the average feed conversion ratioper broiler in fourth week ranged from 0.9 to 3.5.
2. The mean feed conversion ratio of broiler during fourth week in treatments T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 1.95, 1.88, 1.88, 1.65, 1.55, 1.31, 2.03, 1.68 and 1.95 kg, respectively.
3. The overll mean F C.R. of broiler during fourth week of age irrespective of treatment, was 1 76.
4. The differences in feed conversion ratio of broilers during fourth week between treatments were non-significant. (Table-4.52).

From the data contained in Table-4.51 it may be noted that the highest mean feed conversion ratio of broilers during fourth week of age was recorded in T_6 (2 03) followed by T_0 (1.95), T_8 (1.95), T_1 (1.88), T_2 (1.88), T_7 (1.68), T_3 (1.65), T_4 (1.55) and T_5 (1.31). The differences in feed conversion ratio of broilers during fourth week were non-significant, indicating thereby a non-significant effect of treatments on the feed conversion ratio of broilers.

Table 4.51. Feed conversion ratio (kg) of broilers during fourth week of age in different treatments.

Replications	Treatments Feed conversion ratio of broilers in different treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	1 6	1 6	2 5	1 3	1 1	0 9	1 1	1 1	2.0	1.46
2	1 8	1 5	2 1	1 4	1 2	1 0	1 8	1 9	1 5	1 57
3.	1.9	2 6	1 6	1 9	1 7	0 9	2 1	2 1	1 5	1.81
4.	1 5	1 7	1 6	1 5	1 7	1 5	2 2	2 0	2 4	1 78
5.	1.4	2.3	1 6	2 0	1 5	1 9	2 2	1 4	2 0	1 81
6	3 5	1 6	1 9	1 8	2 1	1 7	2 8	1 6	2 3	2 14
Mean	1 95	1 88	1 88	1 65	1 55	1 31	2 03	1 68	1 95	1 76

Table 4.52. ANOVA for the data on feed conversion ratio (kg) of broilers during fourth week of age contained in Table 4.51.

Source of variation	d f	s s	M S.S	F Value		Result	C.D
				Cal	Table (5%)		
Treatments	8	2.61	0.326	1 76	2 ·8	NS	
Replications	5	2 45	0 490	2 64	2 ·5	S	0 501
Error	40	7 42	0 485				
Total	53	12 48					

S = Significant NS=Non-Significant

Mean feed conversion ratio of broilers in fourth week of age (kg).

Treatments								
T_6	T_0	T_8	T_1	T_2	T_7	T_3	T_4	T_5
2.03	1.95	1 95	1 88	1 88	1 68	1.65	1.55	1 31

4.4.5 Feed conversion ratio (kg) of broilers during fifth week of age.

The data regarding average feed conversion ratio in broilers during fifth week of age are presented in Table-4.53 and ANOVA of the same is given in Table-4.54. The following observations were made.

1. Irrespective of treatment, in general, the average feed conversion ratio of broilers in fifth week of age ranged from 0.9 to 3.0.
2. The mean feed conversion ratio of broiler during fifth week in treatments T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 2.15, 1,88, 1.66, 1.36, 1.88, 1,98, 2.41, 1.78 and 1.86, respectively.
3. The overall mean feed conversion ratio of broilers during fifth week of age irrespective of treatment, was 1.88.
4. The differences in feed conversion ratio of broilers during fifth of age between treatments were non-significant (Table-4.54)

From the data on feed conversion ratio of broilers contained in Table-4.53 it may be noted that the highest mean feed conversion ratio of broilers during fifth week of age was recorded in T_6 (2.41) followed by T_0 (2.15), T_5 (1.98), T_4 (1.88), T_1 (1.86), T_8 (1.86), T_7 (1.78), T_2 (1.66) and T_3 (1.36). The differences between these value were found non-significant indicating thereby a non-significant effect of treatments on the feed conversion ratio of broilers.

Table 4.53. Feed conversion ratio (kg) of broilers during fifth week of age in different treatments.

Replications	Treatments Feed conversion ratio of broilers in different treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1	1 9	1 3	2 3	0 9	1 7	2 3	2 6	1 6	1 8	1 82
2	2 3	2 0	1 7	1 2	1 7	1 9	2 7	2 1	2.2	1 97
3	2 3	2 1	1 9	1 3	2 0	1 9	2 7	2 0	1.8	2 0
4	1 8	2 4	1 3	1 8	1 8	1 9	2 1	1 7	2 1	1 87
5.	1.6	1 6	1 2	1 4	2 6	1 9	2.0	1 7	1 8	1 75
6.	3.0	1 9	1 6	1 6	1 5	2 0	2 4	1.6	1 5	1 90
Mean	2.15	1 88	1 66	1 36	1 88	1 98	2 41	1 78	1 86	1 88

Table 4.54. ANOVA for the data on feed conversion (kg) ratio of broilers during fifth week of age contained in Table 4.53.

Source of variation	d f	s s	M S S	F Value		Result
				Cal	Table (5%)	
Treatments	8	2 37	0 296	2 01	2.18	NS
Replication	5	1 05	0 210	1 42	2 45	NS
Error	40	5 9	0 147			
Total	53	9 32				

NS=Non-Significant

Mean feed conversion ratio of broilers in fifth week of age (kg).

Treatments								
T_6	T_0	T_5	T_4	T_1	T_8	T_7	T_2	T_3
2.41	2.15	1.98	1 88	1 88	1 86	1 78	1.66	1 36

4.4.6 Feed conversion ratio of broilers (kg) during sixth week of age:

The data regarding average feed conversion ration in broilers during sixth week of age are presented in Table-4.55 and ANOVA of the same is given in Table-4.56. The following observations were made:

1. Irrespective of treatment in general, the average feed conversion ratioper broiler in sixth week of age ranged from 0.9 to 3.9
2. The mean feed conversion ratio of broiler during sixth week in treatments T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 2.36, 2.93, 2.68, 2.71, 2.90, 2.66, 1.98, 2.20 and 2.40, respectively
3. The overall mean feed conversion ratio of broiler during sixth week of age was 2.53
4. The differences in feed conversion ratio of broilers during sixth week between treatments were non-significant. (Table-4.56).

From the data on feed conversion ratio of broilers contained in Table-4.55, it may be noted that the highest mean feed conversion ratio of broilers during sixth week of age was recorded in T_1 (2.93) followed by T_4 (2.90), T_3 (2.71), T_2 (2.68), T_5 (2.66), T_8 (2.40), T_0 (2.36), T_7 (2.20) and T_6 (1.98), The differences between these value were found non-significant indicating thereby a non-significant effect of treatments on the feed conversion ratio of broilers.

Table 4.55. Feed conversion ratio (kg) of broilers during sixth week of age in different treatments.

Replications	Treatments Feed conversion ratio of broilers in different treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1	1 2	3 8	3 1	3 0	3 2	2 3	1 2	2 3	2 2	2 47
2	1 6	2 4	1 8	2 4	2 6	2 2	1 2	2 9	3 2	2 25
3.	3 3	3.2	2 1	3.0	2.3	2 3	1 2	3 1	2.0	3 75
4	3.1	2 6	3 5	2 3	3 1	3 3	2 3	0 9	2 6	2.63
5.	2 9	1 9	2 6	1 9	2 3	3 3	2 6	2 6	2 0	2.45
6	2.1	3 7	3 0	3 7	3 9	2 6	3.4	1 4	2 4	2.91
Mean	2 36	2.93	2 68	2 71	2 90	2 66	1 98	2.20	2 40	2 53

Table 4.56. ANOVA for the data on feed conversion ratio (kg)of broilers during sixth week of age contained in Table 4.55.

Source of variation	d f	S S	M S S	F. Value		Result
				Cal	Table (5%)	
Treatments	8					NS
Replications	5	4 94	0 617	1 17	2 18	NS
Error	40	2 18	0 436	0 832	2 45	
Total	53	7 12				

NS=Non-Significant

Mean feed conversion ratio of broilers in sixth week of age (kg).

Treatments								
T_1	T_4	T_3	T_2	T_5	T_8	T_0	T_7	T_6
2.93	2.90	2 71	2 68	2 66	2 40	2 36	2 20	1 98

4.4.7 Weekly average feed conversion ratio of broilers (kg) in different treatments:

The data regarding weekly average feed conversion ratio of broilers of different treatments are presented in Table-4.57 and ANOVA of the same is given in Table-4.58. The following observations were made:

1. Irrespective of treatment, the average feed conversion ratioper broiler in first, second, third, fourth, fifth and sixth week of age ranged from 1.4-2.6, 1.7-3.0, 1.12.5, 1.3-2.0., 1.3-2.1 and 1.9-3.0, respectively.
2. The mean feed conversion ratio of broilers, irrespective of treatment in first, second, third, fourth, fifty and sixth week of age was 2.12, 2.15, 1.61, 1.71, 1.82 and 2.50 kg, respectively.
3. The overall mean feed conversion ratio of broilers in sixth week of age in T_0, T_1, T_2, T_3, T_4,T_5, T_6, T_7 and T_8 was 2.3, 2.9, 2.6, 3.0, 2.9, 2.3, 1.9, 2.2 and 2.4 kg, respectively.
4. The mean feed conversion ratio of broilers of T_0, T_1, T_2, T_3, T_4,T_5, T_6 T_7 and T_8 was 2.38, 2.16, 2.0, 2,03, 1.96, 1.78, 1.93, 1.80 and 1.81 kg, respectively.
5. The differences in weekly feed conversion ratio of broilers due to treatment werenon-significant but due to weeks it is significant (Table-4.58).

From the perusal of data contained in Table-4.57 and Figure 4.7, 4.8, It may be noted that the highest weekly feed conversion ratio of broiler was recorded in T_0 (2.38) followed by T_1 (2.16) T_3 (2.03), T_4 (1.96), T_6 (1.93), T_8 (1.81), T_7 (1.80) and T_5 (1.78). The differences between

these values were found non-significant The highest feed conversion ratio of broilers irrespective of treatment was recorded during sixth week (2.50) followed by second week (2.15), first (2.12), fifth (1.82), fourth (1.71) and third week (1.61). The differences in these values of F.C.R. were found significant indicating, thereby, a significant effect of age on feed conversion ratio of broilers. The broilers during the sixth week of age registered significantly higher F C.R. than the broilers during third, fourth and fifth week. However, the differences in feed conversion ratio of broilers during first, second and sixth week were found non-significants being at par. Similarly F.C.R. in broilers during third, fourth and fifth week was not significantly different. The differences in F.C.R. of broilers during first, fourth and fifth week were also found nonsignificant, being at par.

Table 4.57. Weekly average feed conversion ratio (kg) of broilers in different treatments.

Weeks	Treatments Weekly feed conversion ratio (kg) of broilers in different treatments									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	2.5	2.6	2.2	2 3	2.3	1.9	2.1	1 8	1 4	2 12
2.	3.0	1.8	2.6	2.4	1 9	1 9	1.7	1.8	2.3	2.15
3.	2.5	2.1	1.2	1.6	1.4	1 4	1.5	1.7	1.1	1 61
4.	1.9	1.8	1.8	1 6	1.5	1 3	2.0	1.6	1.9	1.71
5.	2.1	1.8	1.6	1.3	1.8	1.9	2.4	1.7	1.8	1.82
6.	2.3	2.9	2.6	3.0	2.9	2.3	1.9	2.2	2.4	2.50
Mean	2.38	2.16	2.0	2.03	1.96	1.78	1.93	1.80	1.81	1.98

Table 4.58. ANOVA for the data on weekly average feed conversion ratio (kg) of broilers contained in Table 4.57.

Source of variation	d.f	s.s	M.S.S	F. Value		Result	C.D
				Cal.	Table (5%)		
Treatments	8	1 80	0.225	1.89	2 18	NS	
Replications	5	4.98	0.996	8036	2.45	S	0.402
Error	40	4.76	0.119				
Total	53	11.54					

S = Significant NS=Non-Significant

Mean feed conversion ratio (kg) of broilers in treatments

Treatments								
T_0	T_1	T_3	T_2	T_4	T_6	T_8	T_7	T_5
2.38	2.16	2.03	2.00	1.96	1.93	1.81	1.80	1.78

Week-wise feed conversion ratio of broilers (kg)

W_6	W_5	W_4	W_3	W_2	W_1
2.50	2.15	2.12	1.82	1 71	1.61

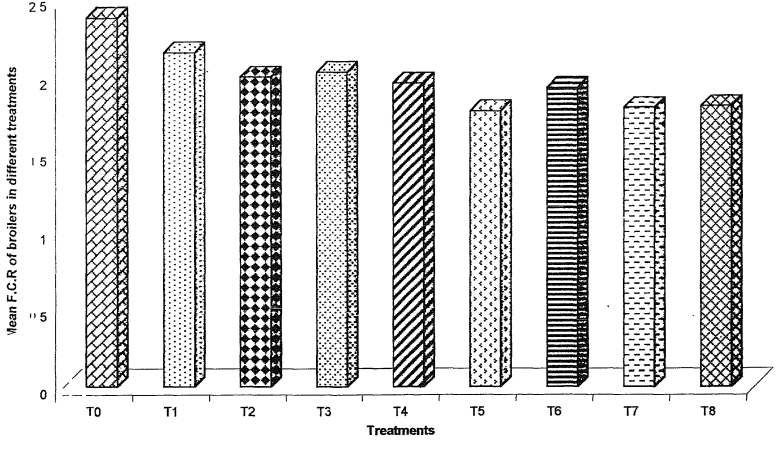


Figure 4.7. Weekly average feed conversion ratio (kg) of broilers in different treatments

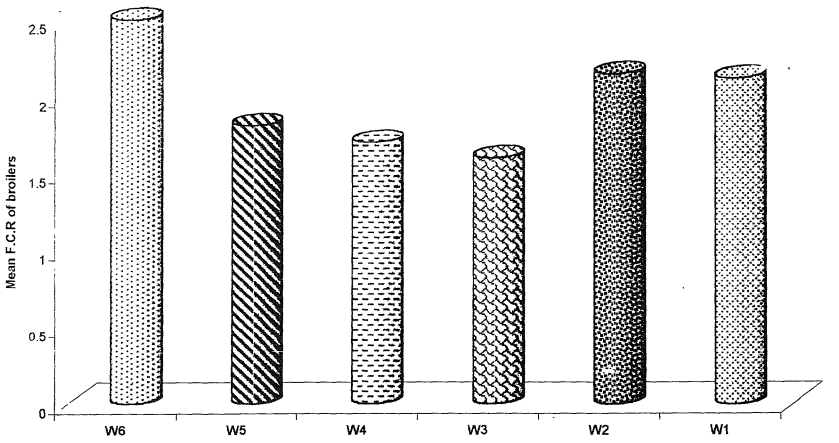


Figure 4.8. Week-wise mean feed conversion ratio (kg) of broilers in different treatments

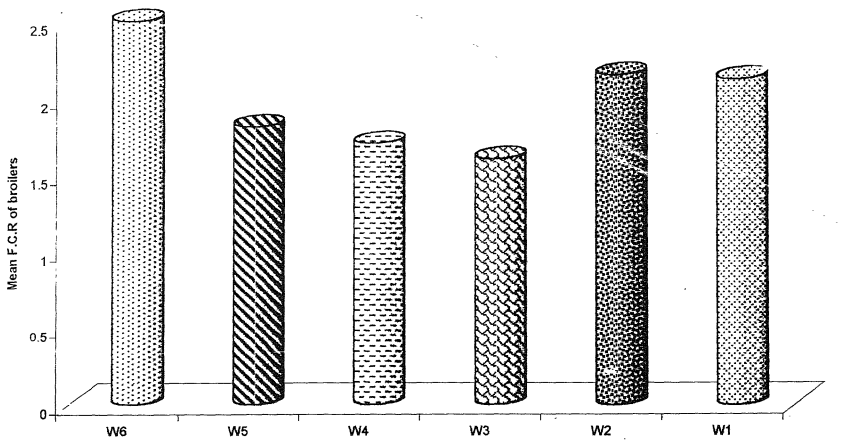


Figure 4.8. Week-wise mean feed conversion ratio (kg) of broilers in different treatments

4.5 BODY WEIGHT OF COCKERELS (g) :

The data regarding body weight of cockerels up to 8 weeks of age in different treatments are presented in Tables 4 59-4.76.

4.5.1. Body weight of day old cockerels (g) in different treatments :

The data regarding body weight of day old cockerels distributed randomly in control (T_0) and 8 different treatments (T_1 to T_8) are presented in Table 4.59 and ANOVA of the same is given in Table 4.60. The following observations were made :

1. In general the body weight of day old chicks ranged from 25 to 40 g.
2. The body weight of day old chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 ranged from 31 to 35, 27 to 25, 30 to 38, 32 to 40, 30 to 36, 26 to 35, 32 to 36, 30 to 36 and 31 to 36 g, respectively.
3. The mean body weight of day old chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 33.16, 31.5, 34.0, 35.5, 33.0, 31.5, 33.3, 34 and 36.6 g, respectively.
4. The differences in body weight of day old chicks between the treatments were non significant (Table 4.60).

From the perusal of data on day old chicks (cockerels) Randomly distributed in different treatments contained in Table 4.1, it was noted that highest mean body weight of day old cockerels was recorded in T_3 (35.5) followed by T_2 34.0, T_7 34.0, T_8 33.6, T_6 33.3, T_0 33.1, T_4 33.0, T_1 31.5 and T_5 31.5 g. but the differences in these values were found non significant, indicating thereby proper distribution of chicks in the treatments without bias.

Table 4.59. Average body weight (g) of day old cockerels in different treatments:

Replications	Treatments Average body weight of day old cockerels (g)								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	35	35	36	32	32	35	30	36	36
2.	32	32	30	35	31	33	31	35	33
3.	34	25	33	38	36	32	35	34	34
4.	33	35	38	40	30	29	30	35	34
5.	34	27	34	34	35	26	35	33	31
6.	31	35	33	34	34	34	36	31	34
Mean	33.16	31.50	34 00	35 50	33.00	31.50	33 30	34 00	33.60

Table 4.60. ANOVA for the data on body weight (g) of day old cockerels contained in Table 4.59

Source of variation	d.f.	s.s.	M.S.S.	F. value		Result
				Cal.	Tab. at 5%	
Treatments	8	54.15	6.76	0.858	2.18	NS
Replications	5	14.15	2.83	0.359	2.45	NS
Error	40	315.19	7.89	-	-	-
Total	53	383.49	17.48	-	-	-

S – Significant NS – Non Significant

Mean body weight of day old cockerels (g).

T_3	T_7	T_2	T_8	T_6	T_0	T_4	T_1	T_5
35.50	34.00	34.00	33.60	33.30	33.16	33.00	31.50	31.50

4.5.2 Body weight of cockerels at first week of age (g)

The data regarding body weight of cockerels at first week of age are presented in Table 4.61 and ANOVA of the same is given in Table 4.62. The following observations were made:

1) Irrespective of treatments, the body weight of cockerels at first week of age ranged from 35 to 81 (g).

2) The average body weight of cockerels at first week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 39 to 60, 35-50, 60-76, 54-81, 38-42, 42-67, 36-48, 35-50 and 39-50 g, respectively.

(3) The mean body weight of cockerels at first week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 45.5, 45.0, 69.8, 61.5, 39.8, 59.2, 40.1, 44.8 and 45.6 g, respectively.

(4) The differences in body weight of cockerels at first week of age between the treatments were significant (Table 4.62, C.D. 9.8).

From the perusal of data on body weight of cockerels at first week of age contained in Table 4.61 it was noted that highest mean body weight of cockerels at first week of age was recorded in T_2 (69.8) followed by T_3 (61.5), T_5(59.2), T_8 (45.6), T_0 (45.5), T_1 (45.0), T_7(44.8), T6(40.6) and T_4(39.8) g. Since the differences in the body weight of cockerels were found significant, it indicated a significant effect of treatments on the body weight of cockerels.

T_2 & T_3 registered significantly higher body weight of cockerels compared to T_0, T_1, T_4, T_6, T_7 and T_8. The control was found at par with T_1, T_2, T_6, T_7 and T_8 as the differences in these values were not significant. However the chiks in control registered significantly less body weight of cockerels than T_2 and T_3. The differences in body weight of chicks between T_3, T_0, and T_5 were also not significant.

Table 4.61 Average body weight (g) of cockerels at first week of age in different treatments:

Replications	Treatments								
	Body weight of cockerels (g) at first week of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	39	48	69	55	42	42	39	45	48
2.	41	41 5	33	65	39	65	38	35	47
3.	40	35	64	56	38	53.5	48	42	39
4.	42	46	76	81	40	65	38	48	45
5.	51	50	63	58	38	67	36	50	45
6.	60	50	74	54	42	63	42	49	50
Mean	45.5	45	69.8	61.5	39 8	59.2	40 1	44.8	45.6

Table 4.62. ANOVA for the body weight of cockerels (g) at first week of age different treatments contained in Table 4.61.

Source of variation	d.f	s.s	M.S.S	F. Value		Result	C.D.
				Cal.	Tab. at 5%		
Treatments	8	5394.3	674.28	11 01	2.18	S	16.24
Replications	5	433.37	86 67	1.41	2.45	NS	-
Error	40.	2448 08	61.20	-	-	-	-
Total	53	8275.75		-	-	-	-

S = Significant NS = Non Significant

Mean body weight of cockerels first week of age (g).

T_2	T_3	T_5	T_8	T_0	T_1	T_7	T_6	T_4
69.8	61 5	59 2	45.6	45.5	45	44 8	40 1	39 8

4.5.3 Body weight of cockerels (g) at second week of age

The data regarding body weight of cockerels at second week of age in different treatments are presented in Table 4.63 and ANOVA of the same is given in Table 4.64. The following observations were made:

1. In general body weight of cockerels at second week of age ranged from 45 to 125 g.
2. The average body weight of cockerels at second week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7, and T_8 ranged from 57 to 71, 45 to 94, 113 to 124, 86 to 125, 56 to 68, 53 to 77, 49 to 73, 58 to 69 and 63 to 91 g., respectively
3. The mean body weight of cockerels at second week of age (g). in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7, and T_8 was 61.2, 74.0, 111.2, 105.5, 63.91, 70.0, 58.5, 62.3, and 70.3. g, respectively.
4. The differences in body weight of cockerels at second week of age (g) between the treatments were significant (Table 4.64).

From the perusal of data on body weight of cockerels at second week of age contained in Table 4.5. It was noted that the highest mean body weight of cockerels at second week of age was recorded in T_2 (111.5), followed by T_3 (105.5), T_1 (74.0), T_8 (70.3), T_5 (70.0), T_4 (63.9), T_7 (62.3,) T_0 (61.25) and T_6 (58.5) g. Since the differences in the body weight of cockerels at second week of age due to test ration were found significant it indicated significant, effect of treatments on the body weight of cockerels. T_2 was found at par with T_3, both the treatments registered significantly higher body weight than other treatments. The, differences between control (T_0), T_4, T_1, T_6, T_5, T_7, and T_8, were found non significant. It was noted that T_2, registered significantly highest body weight of cockerels than other treatments. T_2 and T_3 compared to control registered higher body weight of cockerels.

Table 4.63. Average body weight (g) of cockerels at second week of age in different treatments:

Replications	Treatments Body weight of cockerels (g) at second week of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	57	81	112	98	64	53	49	60.1	73
2.	59	63	124	125	64	71	61	58	68
3	58	45	110	86	68	65	73	62 2	63
4.	58	81	108	125	62.5	77	56	69	63
5.	64.5	94	112	108	69	77	54	64.5	91
6.	71	80	103	91	58	77	58	60	64
Mean	61.25	74 0	111 5	105.5	63.91	70	58.5	62 3	70 3

Table 4.64. ANOVA for the data body weight of cockerels at second week of age (g) different treatments contained in Table 4.63.

Source of variation	d.f	s s	M S.S.	F. value		Result	C D.
				Cal	Tab. at 5%		
Treatments	8	16827.33	2103.41	3 80	2 18	S	29.57
Replications	5	4537.86	907.57	1.64	2.45	NS	-
Error	40.	22084.08	552.10	-	-	-	-
Total	53	43449.27		-	-	-	-

S = Significant . NS = Non Significant

Body weight of cockerels second week of age (g).

T_2	T_3	T_1	T_8	T_5	T_4	T_7	T_0	T_6
111.5	105.5	74 0	70.3	70	63.91	62.3	61.25	58.5

4.5.4 Body weight of cockerels (g) at third week of age.

The data regarding body weight of cockerels at third week of age in different treatments are presented in Table 4.65 and ANOVA of the same is given in Table 4.66. The following observations were made:

1. In general body weight of cockerels at third week of age ranged from 80 to 181 g.
2. The average body weight of cockerels at third week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 ranged from 92 to 110, 80 to 150, 125 to 181, 125 to 152, 103 to 123, 99 to 131, 93 to 107, 83 to 107 and 122 to 139 g., respectively.
3. The mean body weight of cockerels at third week of age (g). in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7, and T_8 was 99.0, 123.9, 150.8, 142.5, 114.3, 118.5, 98.2, 97.0 and 128.5 g., respectively
4. The differences in body weight of cockerels at third week of age (g) between the treatments were non significant (Table 4.66).

From the perusal of data on body weight of cockerels at three weeks of age furnished in Table 4.7 it was noted that highest mean body weight of cockerels was recorded in T_2 (150.8) followed by T_3 (142.5) , T_8 (128.5), T_1 (123.9), T_5 (118.5), T_4 (114.3), T_0 (99.0), T_6 (98.2) and T_7 (97.0) g, however the differences in these values were found non significant indicated, thereby a non significant effect of treatments on body weight of cockerels at third week of age. It is surprising to note that there is a no significant effect of treatments on body weight of cockerels at third week of age but during first & second week of age it was significant.

Table 4.65. Average body weight (g) of cockerels at third week of age in different treatments:

Replications	Treatments Body weight of cockerels (g) at third week age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	92	135	170	125	117	99	98	99	123
2.	98	107 5	181	134	121	125	102.5	97	122.5
3.	95	80	165	152	107	112	107	101	122
4.	98	125	134	150	115	125	94	107	134.5
5.	101	146	125	148	123	131	93	95	139
6.	110	150	130	140	103	119	95	83	130
Mean	99	123.9	150.8	142.5	114.3	118.5	98 2	97	128.5

Table 4.66. ANOVA for the data on body weight of cockerels at third week of age (g) in different treatments contained in Table 4.65.

Source of variation	d.f.	s.s.	M.S.S.	F. value		Result
				Cal	Tab at 5%	
Treatments	8	1814.24	226.78	1.39	2.18	NS
Replications	5	268 03	53.6	0.36	2.45	NS
Error	40	6520.22	163.0			
Total	53	8602.49				

S = Significant NS = Non Significant

Mean body weight of cockerels at third week of age (g).

T_2	T_3	T_8	T_1	T_5	T_4	T_0	T_6	T_7
150.8	142.5	128.5	123.9	118.5	114.3	99.0	98.2	97.0

4.5.5 Body weight of cockerels (g) at four weeks of age:

The data regarding body weight of cockerels at four weeks of age in different treatments are presented in Table 4.67 and ANOVA of the same is given in Table 4.68. The following observations were made:

1. Irrespective of treatment, the body weight of cockerels at four weeks of age ranged from 120 to 220 g.
2. The average body weight of cockerels at four weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 ranged from 120 to 140, 147 to 205, 177 to 220, 102 to 195, 126 to 180, 122 to 183, 124 to 170, 140.5 to 170 and 147 to 184 g., respectively.
3. The mean body weight of cockerels at four weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 was 132.8, 175.0, 192.3, 180.6, 152.8, 158.1, 149.5, 154.6 and 162.9g., respectively.
4. The differences in body weight of cockerels at four weeks of age between the treatments were significant in (Table 4.68).

From the perusal of data on body weight of cockerels at four weeks of age furnished in Table 4.67 it was noted that highest mean body weight of cockerels was recorded in T_2 (192.3) followed by T_3 (180.6), T_1 (175.0), T_8 (162.8), T_5 (158.1), T_7 (154.6), T_4 (152.8,) T_6 (149.5) and T_0 (132.8) g., the differences in these values were found significant, indicating thereby a significant, effect of treatments on body weight of cockerels. It is interesting to note that body weight of cockerels in T_2 compared to other treatments, registered significantly highest body weight of cockerels although it was found at par with T_1 and T_3. The latter two treatments were also found at par with T_5 and T_8. Similarly the differences in body weight of cockerels between T_1, T_4, T_5, T_7 and T_8 were also non significant. The control registered significantly less body weight of cockerels then T_1, T_2, T_3, T_5, & T_8. T_6, control was found at par with T_4, T_6, and T_7.

Table 4.67: Average body weight (g) of cockerels of four weeks of age in different treatments:

Replications	Treatments Body weight of cockerels (g) of four weeks of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	137	185	200	180	177	122	156	145	150
2.	120	166	220	193	180	144.2	140	142	148.5
3.	128.5	147	201	170	126	166.5	124	140.5	147
4.	137.1	182	177	195	130	172	159	157	165.5
5.	134.2	205	179	102	134	161	170	163.5	181
6.	140	165	177	164	170	183	148	170	182
Mean	132.8	175	192.3	180.6	152.8	158.1	149.5	154.6	162.8

Table 4.68. ANOVA for the data on body weight of cockerels at four weeks of age (g) contained in Table 4.67.

Source of variation	d.f	s.s	M.S.S	F. value		Result	C.D
				Cal	Tab. at 5%		
Treatments	8	13934.36	1741.7	5.04	2 18	S	23.38
Replications	5	1398.33	279.66	0.81	2.45	-	-
Error	40	13807 18	345.17	-	-	-	-
Total	.	27742.35					

S – Significant NS – Non Significant

Treatments

Mean body weight of cockerels at four weeks of age(g).

T_2	T_3	T_1	T_8	T_5	T_7	T_4	T_6	T_0
192.3	180.6	175	162.8	158.1	154.6	152.8	149.5	132.8

4.1.6 Body weight of cockerels (g) at fifth weeks of age (g)

The data regarding body weight of cockerels at five weeks of age in different treatments are presented in Table 4.69 and ANOVA of the same is given in Table 4.70. The following observations were made:

1. In general the body weight of cockerels at five weeks of age in ranged from 162 to 309 g.
2. The average body weight of cockerels at five weeks age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 ranged from 211 to 224, 198 to 300, 264 to 309, 231 to 289, 162 to 261, 161 to 293, 195 to 255, 231 to 264 and 179 to 273 g. respectively.
3. The mean body weight of cockerels at five weeks age T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 was 215.5, 244.0, 234.7, 259.1, 225.5, 239.2, 232, 243.7 and 237.5 g, respectively.
4. The differences in body weight of cockerels at five weeks age (g) between treatment were non significant (Table 4.70).

From the perusal of data on body weight of cockerels at five weeks age furnished in Table 4.69, indicated that the highest mean body weight of cockerels at five weeks of age was recorded in T_3 (259.1) followed by T_1 (244.0), T_7 (243.7), T_5 (239.2), T_8 (237.5), T_2 (240.7), T_6 (232.0), T_4 (225.5) and T_0 (215.5 g), however the differences in these values were found non significant which indicated non significant effect of treatments on body weight of cockerels at five weeks age It is interesting to note that control registered lowest mean body weight of cockerels, than other treatments but these were also not significant.

Table 4.69. Average body weight (g) of cockerels at five weeks of age in different treatments.

Replications	Treatments Body weight of cockerels (g) of five weeks of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	219	198	282	286	261	161	231	234	225
2.	211	227	309	289	249	209	213	231	209
3.	215	264	295	274	162	257.2	195	237	179
4.	217	255	264	231	195 5	269.5	249	243	273
5	219	300	269	246	229	246	255	253 5	273
6.	224	220	269	229	257	293	249	264	273
Mean.	215.5	244	234.7	259.1	225 5	239.2	232	243.7	237 5

Table 4.70. ANOVA for the data on body weight of cockerels at five weeks of age (g) contained in Table 4.69.

Source of variation	d.f	s.s	M.S.S	F. value		Result
				Cal.	Tab. at 5%	
Treatments	8	85258 68	10657.33	0.05	2.18	NS
Replications	5	1178.38	355.67	0.0018	2.45	NS
Error	40	7623685.51	190592.13			
Total	53	7710122.57				

NS – Non Significant

Mean body weight of cockerels at five weeks of age (g).

T_3	T_1	T_7	T_5	T_8	T_2	T_6	T_4	T_0
259.1	244.0	243.7	239.7	237.5	234.7	232.0	225.5	215.0

4.5.7 Body weight of cockerels (g) at six weeks of age (g).

The data regarding body weight of cockerels at six weeks of age in different treatments are presented in Table 4.71 and ANOVA of the same is given in Table 4.72. The following observations were made:

1. In general the body weight of cockerels at 6 weeks of age in ranged from 211 to 452g.
2. The average body weight of cockerels at 6 weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 ranged from 211 to 400, 363 to 433, 324 to 452, 262 to 372, 227 to 417, 268 to 360, 335 to 372, 251 to 393 and 291 to 317 respectively.
3. The mean body weight of cockerels at 6 weeks of age T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 was 305.5, 314.4, 396.3, 369.3, 331 5, 337.6, 316.0, 346.8, and 332.7g, respectively.
4. The differences in body weight of cockerels at 6 weeks of age between treatments were non significant (Table 4.72).

From the perusal of data body weight of cockerels at 6 weeks of age furnished in Table 4.71. It was noted that highest mean body weight of cockerels at 6 weeks of age was recorded in T_2 (396.3) followed by T_3 (369.3), T_7 (346.8), T_5 (337.6), T_8 (332.7), T_4 (331.5), T_6 (316.0), T_1 (314.4), T_0 (305.8) g, however the differences in these were found non significant indicating no significant effect of treatments on body weight of cockerels.

It is interesting to note cockerels in T_2 registered highest body weight than control and other treatments the control registered least body weight of cockerels than the treatments, but the differences were not significant.

Table 4.71. Average body weight (g) of cockerels at six weeks of age in different treatments.

Replications	Treatments Body weight of cockerels (g) at six weeks of age								
	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9
1.	211	404	372	372	227	279	336.7	320	307
2.	275.5	384	359	341	294.6	273.5	335	285.5	317
3.	340	433	381	262	362.5	268	338.5	251	312
4.	369	363	452	394	380,5	385.5	342	380	306.7
5.	400	430	324	346	344	360	357	393	301.5
6.	291	364	328	364	417	367	372	367	291
Mean	314.4	396.3	369.3	331.5	337.6	316	346.8	332.75	305.86

Table 4.72. ANOVA for the data on body weight of cockerels at six weeks of age (g) contained in Table 4.71.

Source of variation	d.f	s.s	M S.S	F. value		Result
				Cal.	Tab. at 5%	
Treatments	8	30335.16	3791.88	1.72	2.18	NS
Replications	5	20927.53	4185 50	1.92	2.45	NS
Error	40	87717 74	2192 94	-	-	-
Total	53	138980.43				

S – Significant NS – Non Significant

Mean body weight of cockerels at six weeks of age (g).

T_2	T_3	T_7	T_5	T_8	T_4	T_6	T_1	T_8
396.2	369.3	346.3	337.6	332.7	331.5	316.0	314.4	305.8

4.5.8 Body weight of cockerels (g) at seven weeks of age:

The data regarding body weight of cockerels at seven weeks of age in different treatments are presented in Table 4.73 and ANOVA is the same given in Table 4.74 The following observations were made :

1. In general the body weight of cockerels at 7th week of age (g) in ranged from 292 to 670 g.
2. The average body weight of cockerels at 7th week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 ranged from 460 to 510, 292 to 570, 520 to 670, 470 to 570, 450 to 670, 320 to 520, 420 to 550, 460 to 530 and 420 to 560g respectively.
3. The mean body weight of cockerels at 7th week of age T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T8 was 480 0, 450.5, 517.6, 526.6, 553.3, 480.0, 477.5, 508.7 and 510g respectively.
4. The differences in body weight of cockerels at seven weeks of age were non significant (Table 4.74).

From the perusal of data on body weight of cockerels of seven weeks of age furnished in Table 4.73. It was noted that highest mean body weight of cockerels at 7 weeks of age, was recorded in T_2 (571.6 g) followed by T_4 (553.3), T_3 (526.6), T_8 (510.0), T_7 (508.7), T_0 (480.0), T_5 (480.0), T_6 (477.5) and T_1 (450.5) g, however the differences in these values were found significant, which indicated significant effect of treatments on body weight of cockerels at 7 weeks of age.

T_2 registered significantly higher body weight of cockerels than T_0 ,T_1, T_5 and T_6. The differences in body weight between T_3 , T_4, T_7 and T_8 were also non significantly different. The control was found at par with T_4, T_5, T_7, T_8 and T_1 as the differences were found non significant.

Table 4.73. Average body weight (g) of cockerels at seven weeks of age in different treatments.

Replications	Treatments Body weight of cockerels (g) at seven weeks of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	470	292	580	560	550	360	420	527.5	530
2.	510	411	670	520	570	440	435	530	475
3.	490	530	570	520	450	520	450	525	420
4.	480	500	550	570	510	520	520	520	545
5.	470	570	540	520	670	520	550	490	530
6.	460	400	520	470	570	520	490	460	560
Mean	480	450.5	571.6	526.6	553.33	480	477.5	508.7	510

Table 4.74. ANOVA for the data on body weight of cockerels of seven weeks age (g) contained in Table 4.73.

Source of variation	d f	s.s	M.S.S	F. value		Result	C.D
				Cal.	Tab. at 5%		
Treatments	8	128921.15	16115.14	4.39	2.18	S	76.23
Replications	5	25975.13	9195 03	1.42	2.45	NS	-
Error	40	146751.08	3668.78	-	-	-	-
Total	53	301647.36	28978.95	-	-	-	-

S – Significant NS – Non Significant

Mean body weight of cockerels at seven weeks of age (g)

Treatments

T_2	T_4	T_3	T_8	T_7	T_0	T_5	T_6	T_1
571.56	553.3	526.6	510	508.7	480	408	477.5	450.5

4.5.9 Body weight of cockerels at eight weeks of age (g)

The data regarding body weight of cockerels at eight weeks of age in different treatments are presented in Table 4.75 and ANOVA of the same is given in Table 4.76. The following observations were made :

1. In general the body weight of cockerels at 8th week of age ranged from 360 to 740 g.
2. The average body weight of cockerels at 8th week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 ranged 560 to 610, 360 to 540, 640 to 720, 620 to 740, 530 to 680, 440 to 700, 480 to 610, 610 to 660, and 450 to 700 g respectively.
3. The mean body weight of cockerels at 8th week of age T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 was 591.8, 523.3, 675.0, 660, 625, 600, 552.5, 653.7, and 610 g, respectively.
4. The differences in body weight of cockerels at eighth week of age were significant (Table 4.76).

From the perusal of data on body weight of cockerels of eight weeks of age furnished in Table 4.75 it was noted that the highest mean body weight of cockerels at 8 weeks of age, was recorded in T_2 (675 g) followed by T_3 (660), T_7 (633.7), T_4 (625), T_8 (610), T_5 (600), T_0 (591.8), T_6 (552.8) and T_1 (523.3) g, respectively. Since the differences in these values, were found significant which indicated thereby significant effect of treatments on body weight of cockerels at 8 weeks of age. T_2 registered highest body weight than other treatments T_2 was found at par with T_3, T_4, T_5, T_7 and similarly the control was found at par with T_1, T_5, T_6. The T_2 recorded highest body weight than control T_1, and T_6. The differences in body weight of cockerels between control T_0, and T_4, T_5, T_6, and T_0 were non significant.

Table 4.75. Average body weight (g) of cockerels at eight weeks of age in different treatments.

Replications	Treatments Body weight of cockerels at eight weeks of age (g)								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	610	360	680	620	670	440	480	632.5	600
2.	600	460	690	740	650	540	505	640	525
3.	605	560	720	690	530	640	530	625	450
4.	593.7	620	640	690	590	660	600	610	695
5.	582.5	640	640	630	630	620	590	635	700
6.	560	500	680	590	680	700	610	660	690
Mean	591 86	523.33	675	660	625	600	552.5	633.75	610

Table 4.76. ANOVA for the data on body weight of cockerels of eight weeks of age (g) contained in Table 4.75.

Source of variation	d.f	s.s	M.S S	F. value		Result	C.D
				F. cal.	F. tab. 5%		
Treatments	8	73149 09	9143.63	2.29	2.18	S	79.51
Replications	5	46150.77	9230 15	2 31	2.45	NS	-
Error	40	159632	3990 80	-	-	-	-
Total	53	277931.86	22364.58	-	-	-	-

S – Significant NS – Non Significant

Mean body weight of cockerels at eight weeks of age (g).

Treatment

T_2	T_3	T_7	T_4	T_8	T_5	T_0	T_6	T_1
675	660	633.75	625	610	600	591.8	552.5	523 3

4.5.10 Average weekly body weight of cockerels (g).

The data regarding weekly average body weight of cockerels of different treatments are presented in Table 4.77 and ANOVA of the same is given in Table 4.78. The following observations were made:

1. Irrespective of treatment, the average body weight of cockerels in I, II, III, IV, V, VI, VII, and eighth, weeks ranged from 39.38 to 69.8g, 58.5 to 111.5, 98.2 to 150.8, 132.8 to 192.3, 215.5 to 259.1, 305.8 to 396.3, 450.5 to 571.5 and 523.3 to 675.0 g, respectively.

2. The mean weekly body weight of cockerels in I, II, III, IV, V, VI, VII, and VIII weeks was 50.2, 73.3, 116.53, 161.6, 241.85, 337.1, 506.4 and 541.2 g. respectively.

3. The mean body weight of cockerels in treatments T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 was 238.4, 241.8, 305.95, 288.1, 189.1, 254.25,240.7, 261.46, and 261.85 g, respectively.

4. The differences in body weight of cockerels between treatments were non significant (Table 4.78).

From the perusal of data on weekly Body weight of cockerels (g) furnished in Table 4.77 and Fig 4.9, 4.10, it was noted that the highest mean weekly body weight of cockerels was recorded in T_2 (305.95) followed by T_3 (288.9), T_8 (261.85), T_7 (261.46), T_5 (254.5), T_1 (241.8), T_6 (240.7), T_0 (238.4) and T_4 (189.1) g, but the differences in these values were found non significant which indicated non significant effect of treatments on

weekly body weight of cockerels. However when effect of age was observed the highest mean body weight of cockerels was recorded in 8^{th} weeks (541.2) followed by 7^{tn} week (506.4), 6th week (337.1), fifth week (241 95), 4th week (161.6), 3rd week (116.53), 2^{nd} week (73.3) and 1st week (50.2) .

Since the differences the in these values of body weight were found significant it indicated a significant effect of age on weekly body weight of cockerels. These results were as expected due to increase in growth in body weight with the increase in age of cockerels.

Table 4.77. Weekly average body weight (g) of cockerels in different treatments.

Weeks	Treatments Weekly body weight of cockerels in different treatments									
	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_0	Mean
1.	45.0	69.8	61 5	39 8	59.2	40.1	45.5	45.6	45.5	50.2
2.	59.8	111.5	105 5	63.9	71 0	58.5	62.3	70.3	57 0	73 3
3.	123.9	150.8	142 5	114.3	118.3	98.1	97 0	127.6	76.2	116.53
4.	175.0	192 3	180.6	152.8	153.1	150.8	154 5	162.7	132.6	161.6
5.	242.6	281 3	259 1	225.5	239.1	231.0	243.6	236.0	217 5	241.85
6.	314.3	378.6	369.3	331.6	336.5	317.6	346.6	332.6	307.3	337.1
7.	450.5	588 3	526 6	536.6	480.0	477.5	408.6	510.0	480	506 4
8.	523.3	675	660	458.3	576 6	552 5	633 6	610	591 6	541 2
Mean	241.8	305.95	288 1	189.1	254 25	240.7	261 46	261 85	238.46	

Table 4.78. ANOVA for the data on weekly average body weight of cockerels (g) contained in Table 4.77.

Source of variation	d.f	s.s	M.S.S	F. value		Result
				Cal.	Tab. at 5%	
Treatments	8	70069.25	8758.65	1.925	2.7	NS
Replications	7	2293953	3277707 6	72.06	2.8	S (C.D =1C0.93)
Error	56	2547006	4548.22	-	-	-
Total	71	4911028 25	3291014.47			

S- Significant NS- Non Significant

Mean weekly body weight of cockerels (g) in treatments

T_2	T_3	T_8	T_7	T_5	T_1	T_6	T_0	T_1
305.95	288.1	261.35	261.46	254.25	241.8	240 7	238.46	241.8

Week wise body weight of cockerels (g)

W_8	W_7	W_6	W_5	W_4	W_3	W_2	W_1
541.2	506.4	337.1	241.85	161.6	118.53	73.3	50.2

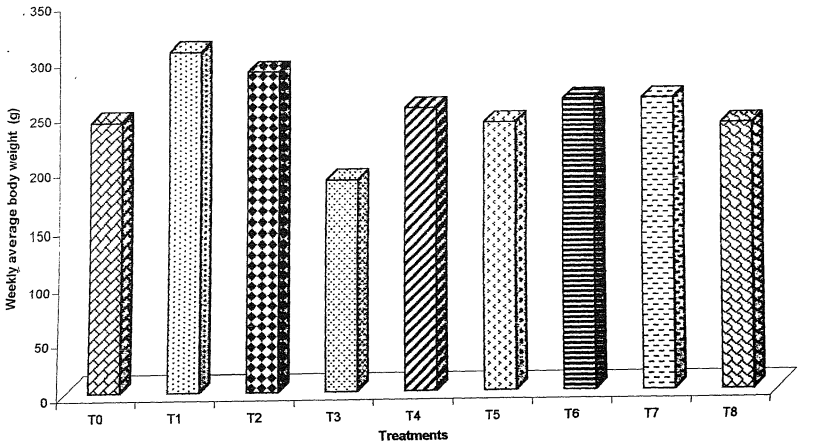


Figure 4.9. Weekly average body weight (g) of cockerels in different treatments

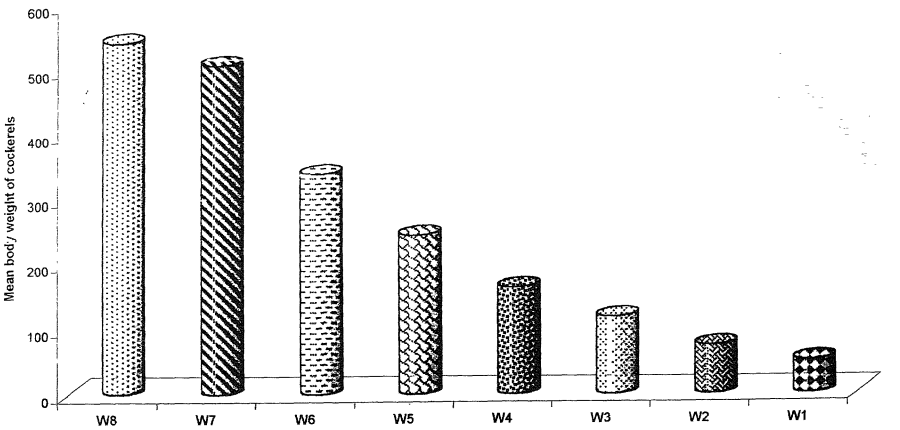


Figure 4.10. Week-wise mean body weight (g) of cockerels in different treatments

4.6 GAIN IN BODY WEIGHT OF COCKERELS (g)

Data regarding weight gain of cockerels are presented in Tables from (4.79 – 4.96).

4.6.1 Weight gain (g) of cockerels during first week of age.

The data regarding weight gain of cockerels during first week are presented, in Table 4.79 and ANOVA of the same is given in Table 4.80. The following observations were made :

1. In general, the weight gain of cockerels at first week of age (g) ranged from 2 to 41 g.

2. The weight gain of cockerels during first week of age n T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 ranged from 4 to 29, 9.5 to 23, 29 to 41, 18 to 41, 2 to 10, 7 to 41, 2 to 13, 4 to 18, and 5 to 16 g, respectively.

3. The mean weight gain of cockerels during first week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 was 12.3, 13.5, 35.8, 26.0, 6.83, 26.15, 6.85, 11.5 and 12.0 g. respectively.

4. The differences weight gain of cockerels due to treatments were significant (Table 4 80).

From the perusal of data on gain in weight of cockerels during first week of age contained Table 4.21, it may be noted that highest weight gain of cockerels, it was recorded in T_2 (35.83 g) followed by T_5 (26.15), T_3 (26.05), T_1 (13.5), T_0 (12.3), T_8 (12.01), T_7 (11.59), T_4 (6.83) and T_6 (6.83)g. The differences in weight gain of cockerels between the treatments were significant, indicating significant effect of treatments on gain in body weight. T_2 registered significant higher weight gain then other treatments and control. Similarly T_5, T_3 also so. registered significant

higher gain in body weight of cockerels, than other treatments and control. The differences between gain in body weight of cockerels between control and T_1, T_4, T_6, T_7, and T_8, were found non significant.

It is interesting to note cockerels in T_2 registered the highest body weight than control and other treatment and the control registered least body weight of cockerels than the treatment but the differences were found non significant.

Table 4.79. Weight gain (g) of cockerels during first week of age in different treatments.

Replications	Treatments Weight gain of cockerels (g) during first week of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	4	13	33	23	10	7	9	9	12
2	9	9.5	43	30	8	32	7	4	14
3.	6	10	31	18	2	21 5	13	8	5
4.	9	11	38	41	10	30	5	13	11
5.	17	23	29	24	3	41	2	17	14
6.	29	15	41	20	8	29	6	18	16
Mean	12 3	13 5	35 83	26 0	6 83	26 15	6 83	11.5	12.0

Table 4.80. ANOVA for the data on weight gain (g) in cockerels during first week of age contained in Table 4.79.

Source of variation	d f	s.s	M S.S	F. values		Result	C D
				Cal.	Tab. at 5%		
Treatments	8	4955.90	619 48	15 32	2.18	S	7 84
Replications	5	432 73	86.54	2.14	2 45	NS	
Error	40	1617 18	40.42	-	-	-	-
Total	53	7005 81	746 44				

S – Significant NS – Non Significant

Mean weight gain of cockerels in first week of age (g).

Treatments

T_2	T_5	T_3	T_1	T_0	T_8	T_7	T_6	T_4
35.83	26.1	26.0	13 5	12 3	12 0	11.5	6.83	6.83

4.6.2 Weight gain (g) of cockerels during second week of age:

The data regarding body weight of cockerels during second week of age are presented in Table 4.81 and ANOVA of same is the given in Table 4.82. The following observations were made :

1. In general, the gain in body weight of cockerels during second week of age (g) in ranged from 10 to 60 g.
2. The gain in body weight of cockerels during second week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 ranged from 11 to 18, 10 to 44, 29 to 51, 30 to 60, 14 to 31, 10 to 14, 10 to 25, 11 to 21 and 14 to 46 g receptively.
3. The mean gain in body weight of cockerels at second week of age T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 was 15.75, 28.9, 41.6, 66.0, 24.08, 11.75, 18.33, 16.8 and 24.6 g, respectively
4. The differences in gain in body weight of cockerels between treatments were non significant (Table 4.82)

From the perusal of data on gain in body weight of cockerels during second week of age furnished in Table 4.81, it was noted that highest gain mean body weight during second week of age, was recorded in T_3 (66.0 g) followed by T_2 (41.6), T_1 (28.9), T_8 (24.6), T_4 (24.08), T_6 (18.3), T_7 (16.8), T_0 (15.7) and T_5 (11.75 g). The differences in these values were found non significant, indicating non significant effect of treatments on gain in body weight of cockerels during second week.

Table 4.81. Weight gain (g) of cockerels during second week of age in different treatments.

Replications	Treatments Weight gain (g) of cockerels during second week of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	18	33	43	43	22	11	10	15 1	25
2.	18	21 5	51	60	25	12	23	19	21
3	18	10	46	30	30	11 5	25	20 2	24
4	16	35	32	44	22 5	12	18	21	18
5.	13 5	44	49	50	31	10	18	14 5	46
6.	11	30	29	37	14	14	16	11	14
Mean	15 75	28.9	41 96	66	24.08	11.75	18 33	16 8	24 66

Table 4.82. ANOVA for the data weight gain (g) of cockerels during second week of age contained in Table 4.81.

Source of variation	d.f	s.s	M.S.S	F. value		Result
				F.Cal	F. tab 5%	
Treatments	8	22507.50	313.44	1 43	2.18	NS
Replications	5	3095.66	619 13	2.83	2.45	S
Error	40	8741.57	218.50			
Total	53	34344.73	1151.07			

S = Significant NS= Non Significant

Mean weight gain of cockerels during second week of age (g)

T_3	T_2	T_1	T_8	T_4	T_6	T_7	T_0	T_5
66.0	41.96	28 9	24.66	24.08	18.33	16.8	15.75	11 75

4.6.3 Weight gain (g) of cockerels during third week of age.

The data regarding weight gain of cockerels during third week of age are presented in Table 4.83 and ANOVA of the same is given in Table 4.84. The following observations were made :

1. In general the gain in body weight of cockerels during third week of age ranged from 9 to 67.5 g.

2. The gain in body weight of cockerels during third week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 ranged from 35 to 40, 35 to 54, 13 to, 58, 9 to 66, 39 to 57, 42 to 54, 34 to, 59, 23 to 38.9 and 13 to 58 g, respectively.

3. The mean gain in body weight of cockerels in third week of age T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 was 37.3, 49.0, 39.3, 37, 50.4, 47.5, 33.0, 34.8 and 57.5 g, respectively.

4. The differences in gain in body weight of cockerels between treatments were significant (Table 4.84)

From the perusal of data on gain body weight of cockerels during third week of age furnished in Table 4.83, it was noted that highest mean body weight gain of cockerels in third week of age was recorded in T_8 (57.5 g) followed by T_4 (50.4), T_1 (49.0), T_5 (47.5), T_2 (39.3), T_0 (37.7), T_3 (37.0), T_7 (34.8) and T_6 (33.6)g. The differences in these values, were found significant, indicating thereby a significant effect of treatments on gain in body weight of cockerels during third week of age.

T_8 registered significantly higher weight gain than control but was found at par with T_1, T_3, T_6 and T_7. The differences weight gain of cockerels between. T_4, T_1, T_5, T_2, T_0, were also non significant. T_8 compared to control T_2, T_4, T_6, and T_7, registered significantly higher weight gain of cockerels in third week.

Table 4.83. Weight gain (g) of cockerels during third week of age in different treatments.

Replications	Treatments Weight gain (g) of cockerels during third week of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	35	54	58	527	53	46	49	38 9	50
2.	39	44.5	57	9	57	48	41 5	39	54 5
3	37	35	55	66	39	47	34	38 8	59
4.	40	44	26	25	52 5	48	38	38	67 5
5	36.5	52	13	40	54	54	39	30 5	48
6.	39	70	27	55	57	42	37	23	66
Mean	37.7	49.0	39.3	37	50.4	47.5	33	34.8	57 5

Table 4.84. ANOVA for the data on weight gain (g) of cockerels during third week of age contained in Table 4.83.

Source of variation	d f	s s	M S S	F.Cal	F tab	Result	C D
Treatments	8	2892 38	361.54	3 35	2.18	S	13 05
Replications	5	135 09	27.01	0 25	2 45	NS	
Error	40	4311.27	107 78				
Total	53	7338.74	496.33				

S = Significant NS= Non Significant

Mean weight gain of cockerels in third week of age (g).

Treatments								
T_8	T_4	T_1	T_5	T_2	T_0	T_3	T_7	T_6
57.5	50 4	49.9	47 5	39.3	37.7	37	34.8	33

4.6.4 Weight gain (g) during fourth week of age in different treatments.

The data recording weight gain of cockerels during fourth week of age are presented in Table 4.85 and ANOVA of the same is given in Table 4.86. The following observations were made :

1. In general the gain in weight of cockerels during fourth week of age ranged from 15 to 87 g.
2. The gain body weight of cockerels during fourth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 ranged from 22 to 45, 15 to 67, 30 to 54, 18 to 59, 11 to 69, 19.2 to 67, 17 to 77, 45 to 87 and 25 to 52 g, respectively.
3. The mean gain body weight of cockerels in fourth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T8 was 33.8, 51.0, 51.5, 38.1, 37.5, 39.6, 51.2, 57.6 and 35 g, respectively.
4. The differences in weight gain of cockerels between treatments were non significant (Table 4.86).

From the perusal of data on body weight gain of cockerels in fourth week of age furnished in Table 4.85, it was noted that maximum weight gain of cockerels in fourth week of age, was recorded in T_7 (57.6) followed by T_6 (51.2), T_1 (51.0), T_2 (41.51), T_5 (39.6), T_3 (38.1), T_4 (37.6), T_8 (35.0), and T_0 (33 8)g, however differences in these values were found significant. This indicated a non significant effect of treatments on the weight gain of cockerels in 4th week of age.

Table 4.85. Weight gain (g) of cockerels during fourth week of age in different treatments.

Replications	Treatments Weight gain of cockerels during fourth week of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	45	50	30	55	54	23	58	46.7	27
2.	22	58 5	39	59	59	19.2	37 5	45	26
3	33 5	67	36	18	19	54 5	17	58 5	25
4.	39 1	57	43	45	15	47	65	50	35
5.	33 2	59	54	34	11	30	77	68 5	45
6.	30	15	47	18	67	64	53	87	52
Mean	33 8	51 0	41 5	38 1	37.5	39 6	51 2	57 6	35.0

Table 4.86. ANOVA for the data on weight gain (g) of cockerels during fourth week of age contained in Table 4.85.

Source of variation	d f	s.s	M S S	F Cal	F. tab	Result
Treatments	8	3189 66	398.70	1.18	2.18	NS
Replications	5	1038 93	207 78	0.61	2.45	NS
Error	40	13417 83	335.44	-	-	-
Total	53	17646.42				

NS – Non Significant

Mean weight gain of cockerels in fourth week of age (g).

T_7	T_6	T_1	T_2	T_5	T_3	T_4	T_8	T_0
57 6	51.2	51.0	41.5	39.6	38.1	37.5	35.0	33.8

4.6.5 Weight gain of cockerels (g) during fifth week of age.

The data regarding weight gain of cockerels during fifth week of age are presented in Table 4.87 and ANOVA of the same is given in Table 4.88. The following observations were made

1. In general the weight gain of cockerels during fifth week of age in ranged from 5 to 117 g.
2. The body weight gain of cockerels during fifth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 ranged from 79.9 to 91, 5 to 117, 82 to 94, 36 to 106, 36 to 95, 39 to 110, 71 to 95, 86 to, 94, and 32 to 107.5, g. respectively.
3. The mean gain in body weight of cockerels in fifth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 was 78 0, 67.6, 89, 78.5, 72.7, 81.2, 81.5, 89.2 and 73.6 g, respectively.
4. The differences in weight gain of cockerels during fifth week of age were non significant (Table 4 88).

From the perusal of data on gain body weight of cockerels fifth week of age furnished in Table 4.87 it was noted that maximum mean gain weight of cockerels during fifth week age, was recorded in T_7 (89.2 g) followed by T_2 (89.0), T_6 (81.5), T_1 (81.2), T_3 (78.5) T_0 (78.0), T_8 (73.6), T_4 (72.7), and T_1 (67.6). Since differences in these values were found non significant, it indicated a non-significant effect of treatments on the weight gain of cockerels during fifth week of age.

Table 4.87. Weight gain of cockerels (g) during fifth week of age in different treatments

Replications	Treatments								
	Weight gain of cockerels during fifth week of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1	82	5	82	106	84	39	75	89	75
2.	91	61	89	96	69	64.8	73	89	53.5
3.	86.5	117	94	104	36	91.2	71	87.5	32
4.	79.9	73	87	36	65 5	97.5	90	86	101.5
5	84.8	95	90	64	95	85	85	90	89
6.	84	55	92	65	87	110	95	94	91
Mean	78.0	67 6	89 0	78 5	72.5	81 2	81.5	89.2	73.6

Table 4.88. ANOVA for the data weight gain (g) of cockerels during fifth week of age contained in Table 4.87.

Source of variation	d.f	s s	M S.S	F. value		Result
				F Cal	F tab. 5 %	
Treatments	8	2598.85	324 85	0.671	2 18	NS
Replications	5	1548 30	309 66	0 64	2 45	NS
Error	40	19350 05	483 75	-	-	-
Total	53	23497 2				

NS – Non Significant

Mean weight gain of cockerels in fifth week of age (g).

T_7	T_2	T_6	T_5	T_3	T_0	T_8	T_4	T_1
89.2	89.0	81 5	81.2	78.5	78.0	73.6	72 5	67.6

4.6.6. Weight gain (g) of cockerels during sixth week of age.

The data regarding weight gain of cockerels during sixth week of age are presented in Table 4.89 and the ANOVA of the same is given Table 4.90. The following observation was made.

(1) In general gain in body weight of cockerels during sixth week of age ranged from 13 to 221 g.

(2) The gain in body weight of cockerels during sixth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8. ranged from 67 to 106, 13 to 114, 75 to 174, 70 to 221, 90 to 117, 66 to 124, 48 to 114, 90 to 108 and 72-120 g, respectively.

(3) The mean weight gain of cockerels during sixth weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 90.0, 70.4, 121.0, 109.6, 105.9, 95.9, 85, 103.1, 95.2 g, respectively.

(4) The difference weight gain of cockerels during sixth week between treatment were non significant (Table 4.90).

From the perusal of data on weight gain of cockerels during sixth week age contained in Table 4.89, it was noted that the highest mean weight gain of cockerels in sixth week of age was recorded in T_2 (121.0), followed by T_3(109.6), T_4 (105.9), T_7 (103.1), T_5 (95.9), T_8 (95.2), T_0 (90.0), T_6 (95.0) and T_1 (70.0), Since differences in these values were found non significant, it indicated a non significant effect of treatments on the weight gain of cockerels during sixth weeks.

Table 4.89. Weight gain (g) of cockerels during sixth week of age in different treatments.

Replications	Treatments								
	Weight gain of cockerels during sixth week of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	88	13	122	86	111	66	48	102 7	95
2.	106	48 5	75	70	92	85.6	60	104	83 5
3.	97	76	174	104	100	91 2	73	101 5	72
4	89 7	114	99	221	108 5	111	109.5	99	107
5.	92 5	100	161	78	117	98	105	103.5	120
6.	67	71	95	99	107	124	114	108	94
Mean	90 0	70 4	121 0	109.6	105.9	95.9	85	103 1	95 2

Table 4.90. ANOVA for the data weight gain (g) of cockerels during sixth week of age contained in Table 4.89.

Source of variation	d.f	s s	M.S S	F. value		Result	C D
				F Cal	F. tab 5 %		
Treatments	8	9881 08	1172 63	1.63	2 18	NS	-
Replications	5	10425 96	2085 19	2 90	2 45	S	76 50
Error	40	28663 41	716 58				
Total	53	48970 45					

S – Significant NS – Non Significant

Mean weight gain of cockerels in sixth week of age (g).

T_2	T_3	T_4	T_7	T_5	T_8	T_0	T_6	T_1
121.0	109.6	105.9	103.1	95.9	95.2	90.0	85.0	70.4

4.6.7 Weight gain of cockerels (g) during seventh week of age:

The data regarding weight gain of cockerels during seventh week of age in different treatment are presented in Table 4.91, and ANOVA for the same is given in Table 4.92. The following observations were made :

(1) In general the weight gain of cockerels during seventh week of age ranged from 81 to 320 g.

(2) The gain in body weight of cockerels during seventh week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8. ranged from 158.5 to 193, 81 to 190, 1110 to 2286, 118 to 188, 178 to 229, 103 to 157.5, 133 to 190, 88 to 195, and 177 to 320 g , respectively.

(3) The mean weight gain of cockerels during seventh week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 172.4, 137, 192, 157.3, 205.1, 142.4, 161.1, 161.8 and 195.5 g. , respectively.

(4) The differences in weight gain of cockerels during seventh week of age between treatments were non significant (Table 4.92).

From the perusal of data on weight gain of cockerels during seventh week of age contained in Table 4.91, indicated that maximum weight gain of cockerels was recorded T_4 (204.1) followed by T_8 (195.5), T_2 (192.0), T_0 (172.4), T_7 (161.8), T_6 (161.5), T_3 (157.3), T_5 (142.4) and T_1 (136). Since the differences in these values were found non-significant, it indicated a non-significant effect of treatments on weight gain of cockerels during seventh week of age.

Table 4.91. Weight gain (g) of cockerels during seventh week of age in different treatment.

Replications	Treatments Weight gain of cockerels during seventh weeks of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	163	81	176	188	178	133	141	190 8	320
2.	193	135 5	286	161	229	145.4	161 5	195	189 5
3.	178	190	137	139	188	157.5	182	186.5	169
4.	173 3	131	187	118	206	139.5	161 5	178	165
5.	158 5	170	110	196	220	176	190	133	137
6.	169	109	256	142	206	103	133	88	193
Mean	172.4	136 0	192.0	157.3	205 1	142.4	161.5	161.8	195.5

Table 4.92. ANOVA for the data on weight gain (g) of cockerels during seventh week of age contained in Table 4.91.

Source of variation	d.f	s.s	M.S.S	F. value		Results
				F.Cal	F. tab. 5%	
Treatments	8	27530 98	3441 37	2.04	2.18	NS
Replications	5	5825 46	1165 09	0.69	2.45	NS
Error	40	67430.46	1685 76			
Total	53	100786 9				

NS – Non Significant

Mean weight gain of cockerels in seventh week of age (g).

T_7	T_2	T_6	T_5	T_3	T_0	T_8	T_4	T_1
89.2	89 0	81 5	81 2	78 5	78 0	73 6	72 5	67.6

4.6.8 Weight gain (g) of cockerels during eigth weeks of age:

The data regarding weight gain of cockerels during 8th week of age are presented in Table 4.93) and ANOVA of the same is given in Table 4.94 .The following observations were made :

(1) In general weight gain of cockerels during eighth week of age ranged from 20 to 220g. .

(2) The weight gain of cockerels during eighth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 ranged from 90 to 140, 30 to 120, 20 to 150, 60 to 220, 60 to 180, 80 to 180, 40 to 120, 90 to 200 and 30 to 170 g., respectively

(3) The mean weight gain of cockerels during eighth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 111.7, 72.8, 86.6, 133.3, 88.3, 120, 75, 125 and 100g. , respectively.

(4) The differences weight gain of cockerels during eighth week of between treatments were non significant (Table 4.94).

The perusal of data weight gain of cockerels in 8th week of age contained in Table 4.93. indicated that maximum weight gain of cockerels during eighth week of age was recorded in T_3 (133.3) followed by T_7 (125.0), T_5 (120), T_0 (111.7), T_8 (100), T_4 (88.3), T_2 (86.3), T_6 (75) and T_1 (72.8) Since differences in these values were found non significant, it indicated a non- significant effect of treatments on weight gain of cockerels during eighth week of age .

Table 4.93 . Weight gain (g) of cockerels during eigth week of age in different treatment.

Replications	Treatments Weight gain of cockerels during eighth week of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	140	68	100	60	120	80	60	105	70
2	90	49	20	220	280	100	70	110	50
3.	115	30	150	170	180	120	80	100	30
4.	113	120	90	120	80	140	80	90	150
5.	112.5	70	100	110	60	100	40	145	170
6.	100	100	60	120	110	180	120	200	130
Mean	111.27	72 8	86 6	133 3	88 3	120	75	125	100

Table 4.94. ANOVA for the data weight gain (g) of cockerels during eighth week of age contained in Table 4.93.

Source of variation	d.f	s.s	M.S.S	F.Cal	F. tab	Result
Treatments	8	23595.31	2949 41	1.95	2.18	NS
Replications	5	8522 13	1704.42	1 2	2.45	NS
Error	40	60496 57	1512 41			
Total	53	92614.01				

NS – Non Significant

Mean weight gain of cockerels in eighth week of age (g).

T_3	T_7	T_5	T_0	T_8	T_4	T_2	T_6	T_1
133.3	125 0	120.0	111.27	100 0	88 3	86 6	75 0	72 0

4.6.9 Weekly weight gain (g) of cockerels in different treatments :

The data regarding average weekly weight gain of cockerels in different treatments are presented Table 4.95 and ANOVA of the same is given in Table 4.96. The following observations were made :

(1) Irrespective of treatment, the average weight gain of cockerels during I, II, III, IV, V, VI, VII and VIIIth weeks ranged from 6.83 to 35.8, 11.7 to 66.0, 73.0 to 50.11, 33 to 57.6, 33.8 to 57.6, 67 6 to 89.2, 70.4 to 121, 136 to 205.1 and 72.8 to 1132 3 g. respectively.

(2) The mean weekly weight gain of cockerels during I, II, III, IV, V, VI, VII and VIII weeks was 16.76, 27.51, 43.0, 42.8, 79.03, 95.3, 150.4, and 90.3 g., respectively.

(3) The mean weekly weight gain of cockerels during first, second, third, fourth, fifth, sixth, seventh and eight weeks in treatments T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 59.2, 82.0, 81.15, 73.91, 70.28, 62.59, 71.91, 77 0 and 68.95g., respectively.

(4) The differences in the weekly gain weight of cockerels between the treatments and weeks were significant (Table 4.96.)

From the perusal of data on weekly weight gain of cockerels contained in Table 4.95, Figure. 4.11 and Figure 4.12, it was noted that highest weekly weight gain of cockerels was recorded in T_2 (82.09 g) followed by T_3 (81.15), T_8 (770), T_4 (73.91), T_7 (711.91), T_5 (70.28), T_0 (68.95) T_6 (62 59), T_1 (59.2) and the differences in these values were found significant, indicating thereby a significant effect of treatments on weekly weight gain of cockerels. T_2 and T_3 compared to T_0, and T_2 registered significantly higher weekly weight gain which were found

significant. The control was found at par with T_1, T_4, T_5, T_6, T_7, and T_8 Similarly the differences in weekly weight gain between T_0, T_2, T_3, T_4, T_5, T_7, T_8 were non-significant it was noted that the highest weekly mean weight gain of cockerels was recorded in 7th week (150.4) followed by 6th week (95.3), 8th week (90.3), 5th week (79.03), 3rd week (43.0), 4th week (42.8), 2nd week (27.51) and 1st week (16.76). The differences were found significant which indicated a significant effect of treatments on weekly weight gain of cockerels. The differences between VI and VIII week, III and IV week between were found non significant. cockerels in VIIth week registered significantly highest weekly weight gain in cockerels.

Table 4.95. Weekly average weight gain (g) of cockerels in different treatments.

Weeks	Treatments Average weekly weight gain (g) of cockerels									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	12 2	13.5	35 8	26	6.83	26.1	6 83	11.5	12	16 76
2	15 65	28 9	41 6	66 0	24 0	11 7	18 3	16 8	24.6	27 51
3.	37 7	49 9	39 9	37	50 4	47.5	33 0	34 8	57.5	43.0
4	33.8	35 0	31	41.5	38 1	37 5	39.6	51.2	57.6	42.8
5.	78.0	67.6	89 0	78 5	72 7	81 2	81.5	89.2	73.6	79.03
6.	90.0	70.4	121.0	109 6	105.9	95 9	85 0	85.0	95.2	95 3
7.	172.4	136 0	192 0	157.3	205 1	142.4	161.5	181.8	195.5	150.4
8.	11.7	72 8	86 6	133.3	88 3	120	75	125	100	90.3
Mean	68 95	59 2	82.0	81 15	73.91	70 28	62.59	71.91	77.0	

Table 4.96. ANOVA for the weekly average weight gain (g) of cockerels contained in Table 4.95.

Source of variation	d f	s s	M S S	F value		Result	C D
				Cal	Tab at 5%		
Treatments	8	3808 25	476 03	2 37	2 7	S	15.13
Weeks	7	158894.6	22699.22	113.41	2 8	S	7.07
Error	40	11207 99	200 14				
Total	55	173910.84	23375.39				

S – Significant NS – Non Significant

Weekly mean weight gain (g) of cockerels in treatments

T_2	T_3	T_8	T_4	T_7	T_5	T_0	T_6	T_1
82.0	81 15	77 0	73 91	71 91	70.25	68 95	62.59	59.2

Week wise mean weight gain of cockerels(g)

W_7	W_8	W_6	W_5	W_3	W_4	W_2	W_1
150.4	90 3	95.3	79.03	43.0	42.8	27.51	16.76

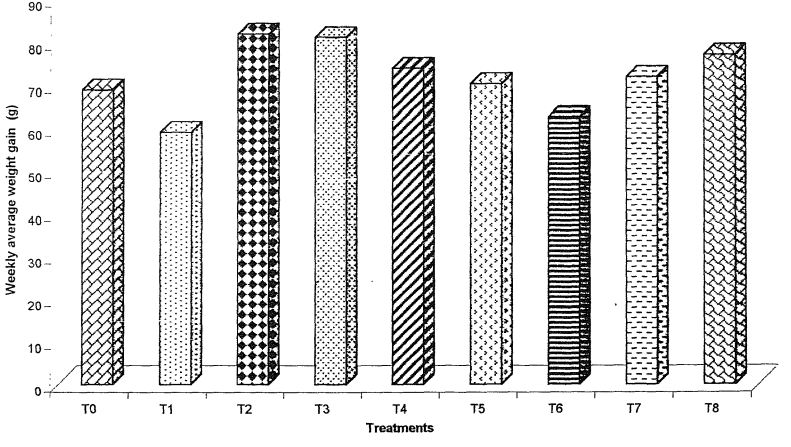


Figure 4.11. Weekly average weight gain (g) of cockerels in different treatments

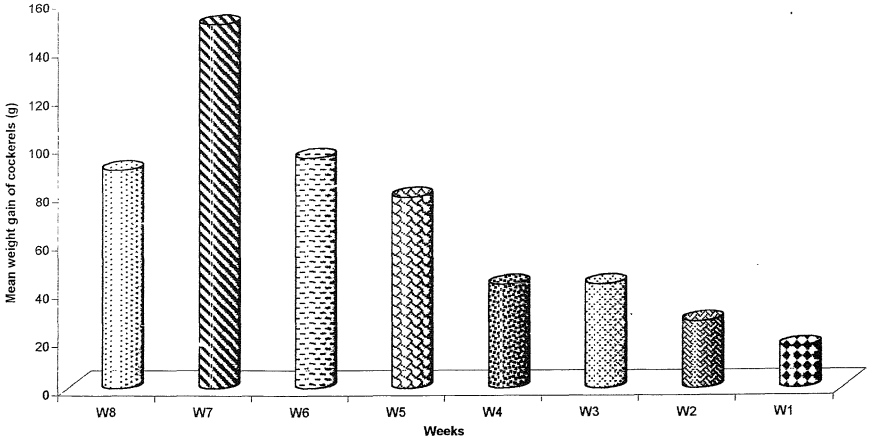


Figure 4.12. Week-wise mean weight gain of cockerels (g) in different treatments

4.7. FEED CONSUMPTION OF COCKERELS (g):

The data regarding feed consumption of cockerels during eight weeks age duration are presented in Tables 4.97 to 4.114.

4.7.1 Feed consumption of cockerels (g) during first week of age:

The data recoding feed consumption per cockerel in first week of age in different treatments are presented in Table 4.97 and the ANOVA of the same is given in Table 4 98. The following observations were made:

(1) In general the feed consumption per cockerel during I week of age ranged from 35.1 to 86 g

(2) The feed consumption per cockerel in first week of age in treatments T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 ranged from 56.0 to 68.0, 50.0 to 60.0, 80.0 to 86.0, 73.3 to 76.3, 35.0 to 35.3, 56.6 to 66.0, 53.0 to 51 3, 56.6 to 65.0 and 71.0 to 72.3 g, respectively.

(3) The mean feed consumption per cockerel in first week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 62.3, 55.0, 83.0, 74.8, 35.1, 61.3, 52.1, 60.8 and 71.6 g respectively.

(4) The differences in the feed consumption per cockerel in I^{st} week of age between different treatment were significant (Table 4.98).

From the perusal of data on feed consumption per cockerel in first week of age contained in Table 4.97. It was noted that highest mean feed consumption (g) per cockerel in first week of age, was recorded in T_2 (83.0) followed by T_3 (74.8), T_8 (71.6), T_0 (62.3), T_5 (61.3), T_7 (60.8), T_1 (55.0) T_1 (52.1) and T_4 (35.1) and differences in these were found significant, indicating thereby significant effect of treatments on feed

consumption per cockerel. T_4 compared to T_2, T_3 and T_8. registered lowest feed consumption It was recorded lowest feed consumption per cockerel in first week age significantly less feed consumption was recorded in T_6 and T_2 The differences between treatments Feed consumption per cockerels I^{st} week of age in T_0, T_1, T_4, T_6, T_7 were non significant. Similarly the differences per cockerel between content T_2, T_3, T_5, T_7 and T_8 were also non significant.

Table 4.97. Average feed consumption of cockerels (g) during first week of age in different treatments.

Replication	Treatments Feed consumption of cockerels (g) during first of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1	56 6	50 0	80 0	73 3	35 0	56 6	53 0	56 6	71 0
2.	68.0	60	86.0	76.3	35 3	66 0	51.3	65	72 3
Mean	62 3	55 0	83 0	74 8	35 1	61 3	52 1	60 8	71 6

Table 4.98. ANOVA for the data on average feed consumption of cockerels (g) during first week of age contained in Table 4.97.

Source of variation	d.f	s.s	M.S.S	F. value		Result	C.D
				Cal.	Tab. at 5%		
Treatments	8	3067 34	333 34	5 82	2.44	S	27 90
Replications	1	162.6	162.6	2 58	3.54	N.S	
Error	8	526.8	65.80	-	-	-	-
Total	17	3756.74					

S – Significant NS – Non Significant

Mean feed consumption of cockerels in first week of age (g).

Treatments

T_4	T_6	T_1	T_7	T_5	T_0	T_8	T_3	T_2
35.1	52.1	55.0	60 8	61 3	62 3	71.6	74.8	83.0

4.7.2. Feed consumption of cockerel (g) in second weeks of age:

The data regarding feed consumption per bird during second week of age, are presented in Table 4.99 and ANOVA of the same is given in Table 4.100 the following observation were made :

(1) Irrespectively of treatment, average feed consumption per bird during second week of age ranged form 72 to 144.6 g

(2) The feed consumption per bird in second week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 ranged from 76.6 to 83.3, 72.0 to 100, 105 to 115.6, 141.6 to 144.6, 68.6 to 69.6, 66.6 to 71.3, 76.3 to 73.3, 74.3 to 80.6 and 91.6 to 88.3 g, respectively.

(3) The average feed consumption per bird during second week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 79.9, 86.0, 110.3, 143.1, 69.1, 68.9, 74.8, 77.4 and 89.9 g, respectively.

(4) The differences in the feed consumption per bird in IInd week of age between the different treatment were found significant (Table 4.100).

From the perusal of data on feed consumption per bird in second week age contained in Table 4.99 indicated that highest average feed consumption per bird in second week of age was recorded in T_3 (143.14 g) followed by T_2 (110.3), T_8 (89.9), T_1 (86.0), T_0 (79.9), T_7 (77.4), T_6 (74.8), T_4 (69.1) and T_5 (68.9). The control (T_0) was at par with T_1, T_4, T_5, T_6, T_7 and T_8. Birds in T_2 and T_3 registered significantly more feed consumption compared to control (T_0) and other treatments.

Table 4.99. Average feed consumption of cockerels (g) during second weeks of age in different treatments.

Replications	Treatments Average feed consumption of cockerels (g) during second weeks of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	76.6	72 0	105	141.6	68.6	66 6	76.3	74 3	91.6
2.	83.3	100	115 6	144 6	69 6	71 3	73.3	80 6	88 3
Mean	79.9	86	110 3	143 1	69.1	68 9	74 8	77 4	89 9

Table 4.100. ANOVA for the data on average feed consumption of cockerel (g) during second week of age contained in Table 4.99.

Source of variation	d.f	s.s	M.S.S	F. value		Result	C.D
				Cal.	Tab. at 5%		
Treatments	8	91840	1148.0	30 55	3 44	S	19 38
Replications	1	1.58	1 58	0 42	3.54	NS	
Error	8	3005 98	375.74	-	-	-	-
Total	17	94847 56					

S – Significant NS – Non Significant

Mean feed consumption of cockerels during second week of age (g)

Treatments

T_3	T_2	T_8	T_1	T_0	T_7	T_6	T_4	T_5
143.1	110.3	89.9	86 0	79.9	77.4	74.8	69.1	68 9

4.7.3. Feed consumption cockerel (g) during third week of age:

The data regarding average feed consumption per bird during third week of age are presented in Table 4.01 and ANOVA of the same given in Table 4.102. The following observations were made :

(1) Irrespective of treatment, the average feed consumption during third week of age ranged from 73.3 to 194.0 g.

(2) The average feed consumption per cockerels during 3 week age in T_0, T_1, T_2, T_3, T_4, T_5 T_6, T_7 and T_8 ranged from 93.3 to 106.6, 142 to 116.6, 155.0 to 133.3, 191.6 to 194.0, 105.6 to 104.3, 73.3 to 78.3, 87.0 to 80.0, 99.0 to 96.6 and 105 to 108.3 g., respectively.

(3) The average feed consumption per cockerel in third week of age in T_0, T_1, T_2, T_3, T_4, T_5 T_6, T_7 and T_8 was 99.9, 129.3, 144 1, 192.8, 104.9, 75.8, 83.5, 97.8, 106.6 g., respectively.

(4) The differences in average feed consumption per cockerel in third week of age between treatments were found significant. (Table 4.102).

From the perusal of data on average feed consumption per cockerels in third week of age contained in Table 4.44 indicated that lowest feed consumption per cockerel in third week of age was recorded in T_5 (75.8) followed by T_6 (83.5) T_7 (97.8), T_0 (99.9), T_4 (104.9), T_8 (106.6), T_1 (129.3), T_2 (144.1) and T_3 (192.8). The differences in these values were found significant, which indicated a significant effect of treatments on feed consumption of bird during third week of age. The control was found at par with T_4, T_6, T_7 and T_8. But registered significant less feed consumption per cockerels than birds in T_1, T_2 and T_3. Compared to T_0 the T_5 registered significantly less feed consumption per bird

Table 4.101. Average feed consumption of cockerels (g) during third week of age in different treatments.

Replication	Treatments Average feed consumption of cockerels (g) during third week of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1	93 2	142 0	155 0	191.6	105 6	73.3	87 0	99 0	105
2.	106 6	116 6	133 3	194 0	104.3	78.3	80.0	96.6	108.3
Mean	99 9	129 3	144 1	192 8	104 9	75.8	83 5	97 8	106 6

Table 4.102. ANOVA for the data on average feed consumption cockerels (g) during third week of age contained in Table 4.101.

Source of variation	d f	s s	M S S	F.Cal	F tab	Result	C D
Treatments	8	20657 7	2582 2	27 26	2 36	S	22.9
Replications	1	63 4	63.4	0.66	3.54	NS	
Error	8	757.8	94.74	-	-	-	-
Total	17	21478.9					

S – Significant NS – Non Significant

Mean feed consumption of cockerels during third week of age (g).

Treatments

T_5	T_6	T_7	T_0	T_4	T_8	T_1	T_2	T_3
75 8	83.5	97 8	99 9	104.9	106.6	129 3	144.1	192.8

4.7.4 Feed consumption per cockerels at four weeks of age (g)

The data regarding feed consumption per cockerel during 4th week of age are presented in Table 4 103 and ANOVA of the same is given in Table 4.104. The following observations were made :

(1) In general, feed consumption per cockerel in four weeks of age ranged 93.3 to 241 0 g.

(2) The average feed consumption per cockerel in four weeks of age in T_0, T_1, T_2, T_3, T_4, T_5 T_6, T_7 and T_8 ranged from 116.6 to 123.3, 173.3 to 189.00, 160.0 to 168.3, 241.0 to 240.0, 146.6 to 133.3, 23.3 to 127.6, 103.3 to 133 55, 106 6 to 125 0 and 116 6 to 125 g, respectively.

(3) The average feed consumption per cockerel in four weeks in T_0, T_1, T_2, T_3, T_4, T_5 T_6, T_7 and T_8 was 119.9, 164.1, 240.3, 139.9, 110.4, 118.3, 115.8 and 123 9 g, respectively.

(4) The differences in average feed consumption per cockerel during four weeks between the treatments were non significant. (Table 4.104).

From the perusal of data on feed consumption per cockerel during four weeks contained in Table 4.103 indicating that highest feed consumption per cockerel in 4th week was recorded in T_3 (240.3) followed by T_1, (181.1), T_2 (164.1), T_3 (139.9), T_8 (123.9), T_0 (119.5), T_6 (118.3), T_7 (115.8) and T_5 (110.4) and the differences in there values were found non significant. indicating thereby non significant effect of treatments on feed consumption of cockerels during 4th week of age.

Table 4.103. Average feed consumption of cockerels (g) during fourth week of age in different treatments.

Replications	Treatments Average feed consumption of cockerel (g) during four weeks of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	116.6	173.3	160 0	241.0	146.6	93.3	103.3	106.6	116.6
2.	123.3	189.0	168.3	240.0	133.3	127.6	133.3	125.0	131.3
Average	119.9	181.1	164.1	240.3	139.9	110.4	118.3	115.8	123.9

Table 4.104. ANOVA for the data on average feed consumption cockerels (g) during fourth week of age contained in Table 4.103.

Source of variation	d.f	s.s	M.S.S	F. value		Result
				Cal.	Tab. at 5%	
Treatments	8	21624 0	2035	0 019	3 36	NS
Replications	1	723 2	723.2	0 68	3.54	NS
Error	8	8494	1062 2	-	-	-
Total	17	30841 2				

S – Significant NS – Non Significant

Mean feed consumption of cockerels during fourth week of age (g) . Treatments

T_3	T_1	T_2	T_4	T_8	T_0	T_6	T_7	T_5
240.3	181 1	164 1	139.9	123.9	119 9	118 3	115 8	110 4

4.7.5 Feed consumption per cockerel in five weeks of age (g)

The data regarding feed consumption per cockerels during fifth week are presented in Table 4.105 and ANOVA of the same is given in Table 4.106. The following observations were mode :

(1) In general feed consumption per cockerel in five week of age ranged from 116.6 to 273.3 g.

(2) The average feed consumption per Cockerel during fifth week age in T_0, T_1, T_2, T_3, T_4, T_5 T_6, T_7 and T_8 ranged from 138.3 to 145.0, 203.3 to 213.3, 233.3 to 253.3, 266.6 to 273.3, 170 to 160.0, 106.6 to 133.3, 126.6 to 153.3, 116 6 to 146.6 and 146.5 to 153.3 g, respectively.

(3) The mean feed consumption per cockerel in fifth week of age T_0, T_1, T_2, T_3, T_4, T_5 T_6, T_7 and T_8 was 141.6, 208.3, 243.3, 269.9, 165.0, 119.9, 139.9, 131.6 and 149.9 g, respectively.

(4) The differences in feed consumption of cockerels during 5^{th} week between treatments were non-significant (Table 4.105).

From the perusal of data on feed consumption per cockerel during fifth week of age contained in Table 4.47, indicated that highest mean feed consumption per bird (g) was recorded in T_3 (269.9) followed by T_2 (243.3), T_1 (208.3), T_4 (165.0), T_8 (14.9), T_0 (141.6), T_6 (139.9), T_7 (131.6),T_5 (119.9) and differences in these value were found non significant indicating thereby non significant effect of treatments on feed consumption . of cockerels during fifth week of age.

Table 4.105. Average feed consumption of cockerels (g) during fifth week of age in different treatments.

Replications	Treatments								
	Average feed consumption of cockerel (g) during fifth week of age								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	138.3	203 3	233 3	266 6	170 0	106 6	126 6	116 6	146 6
2	145 0	213 3	253 3	173.3	160 0	133 3	153 3	146.6	153 3
Mean	141.6	208.3	243 3	269 9	165.0	119.9	139 9	131 6	149 9

Table 4.106. ANOVA for the data on average feed consumption of cockerels during fifth week of age contained in Table 4.105.

Source of variation	d.f	s.s	M.S.S	F. value		Result
				Cal.	Tab. at 5%	
Treatments	8	615048 1	76881.0	1.75	2.54	NS
Replications	1	277508 77	27750 77	6.26	3.54	S
Error	8	354291 9	44286 47	-	-	-
Total	17	1246848 77				

S – Significant NS – Non Significant

Mean feed consumption of cockerels during fifth week of age (g).

T_3	T_2	T_1	T_4	T_8	T_0	T_6	T_7	T_5
269.0	243.3	208.3	165 0	149 9	141.6	139 9	131.6	119 9

4.7.6 Feed consumption per cockerel in six weeks of age (g)

The data regarding feed consumption per bird in six weeks of age are presented in Table 4.107 and ANOVA of the same is given in Table 4.108. The following observations were mode :

(1) In general, feed consumption per cockerels in six weeks age ranged from 123.3 to 326.6g.

(2) The average feed consumption per cockerel in six weeks of age in T_0, T_1, T_2, T_3, T_4, T_5 T_6, T_7 and T_8 ranged from 138.3 to 145.0, 203.3 to 213.3, 233.3 to 253.3, 266.6 to 273.3, 170.0 to 160.0, 106.6 to 133.3, 126.6 to 153.3, 116.6 to 153.3 and 146.6 to 153.3g respectively.

(3) The mean feed consumption per cockerel in six weeks of age in T_0, T_1, T_2, T_3, T_4, T_5 T_6, T_7 and T_8 was 199.95, 249.96, 321.6, 306.6, 211.6, 156.6, 174.95, 168.3, 208.3g respectively.

(4) The differences in feed consumption of cockerels during 6th week of age between treatments were significant (Table 4.108).

From the perusal of data on feed consumption of cockerels during 6th week of age contained Table 4.107 indicated that highest feed consumption was recorded in T_3 (321.6) followed by T_2 (306.6), T_1 (249.9), T_4 (211.6), T_8 (208.3), T_0 (199.9), T_6 (176.9), T_7 (168.3) and T_5 (156.6) and differences in these were found significant indicating thereby significant effect of treatment on the feed consumption of cockerels in 6th week of age. The control was found at par with T_4, T_5, T_6, T_7 and T_8, however it

registered significantly less feed consumption per bird than T_2, and T_3. Feed consumption per cockerel between latter two treatment was also not significant. The differences in feed consumption of cockerels, between T_0, T_1, T_4 and T_8 were also non significant.

Table 4.107. Average feed consumption of cockerels (g) during sixth week of age in different treatments.

Replication	Treatments Average feed consumption of cockerels during six week of age (g)								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1.	203.3	243 3	316 6	305 0	306 6	123 3	141 6	173 3	175.0
2.	196.6	256 6	326.6	308 3	216.6	109.0	208.3	163.3	241.6
Average	199 95	249.95	321 6	306.65	211.6	116 65	174 95	168 83	208.3

Table 4.108. ANOVA for the data on average feed consumption cockerels (g) during sixth week of age contained in Table 4.107.

Source of variation	d.f	s.s	M.S.S	F.Cal	F. tab	Result	C.D
Treatments	8	56612 53	7076.56	6 22	3.44	S	54.68
Replications	1	2936 33	2936.33	2 58	5 38	NS	
Error	8	9098.32	1137 29	-	-	-	-
Total	17	68647 18	11150 18				

S – Significant NS – Non Significant

Mean feed consumption cockerels in sixth week of age(g).

Treatments

T_5	T_7	T_6	T_0	T_8	T_4	T_1	T_3	T_2
156.65	168.3	174.9	199.9	208.3	211.6	249.9	306.6	321.6

4.7.7 Feed consumption of cockerels in seventh week of age (g)

The data regarding feed consumption of cockerel in 7th week of age are presented in Table 4.109 and ANOVA of the same is given in Table 4.110. The following observations were made :

(1) Irrespective of treatment the average feed consumption per cockerel in 7th week of age ranged from 183 to 471.6 g.

(2) The average feed consumption per bird in 7th week of age in T_0, T_1, T_2, T_3, T_4, T_5 T_6, T_7 and T_8 ranged from 328.3 to 325 0, 366 6 to 433.3, 410 to 366.6, 406.0 to 471.6, 236.6 to 243.3, 190 to 256.6, 183.3 to 250, 293.3 to 206.6 and 283.3 to 333.3 g., respectively.

(3) The mean feed consumption per cockerel in 7th week of age in T_0, T_1, T_2, T_3, T_4, T_5 T_6, T_7 and T_8 in 326.05, 399.9, 388.3, 438.3, 239.95, 223.3, 216.65, 239.2 and 308.3 g., respectively.

(4) The differences in feed consumption of cockerels in 7th week of age between treatments were significant (Table 4.110).

The perusal of data, on feed consumption in 7th week of age contained in Table 4.109 indicated that lowest feed consumption per cockerel in 7th week of age was recorded in T_3 (438.3) followed by T_1 (399.95), T_2 (388.3), T_0 (326.0), T_8 (330.7) T_4 (239.98), T_7 (239.96), T_5 (223.3) and T_6 (216.45) and the differences in these were found significant which indicated significant effect of treatments on feed consumption of cockerels in 7th week of age. T_3 registered significant higher feed consumption per bird than other treatments. T_1 was found at par with T_2

but registered significantly higher feed consumption per cockerel than other treatments although this was found at par with T_2.

The control was at par with T_8 and both then registered significantly higher feed consumption par bird than T_4, T_5, T_6 and T_7. The feed consumption of birds in T_6 was at par with birds in T_5 but registered less feed consumption than other treatments including control. The feed consumption per bird in T_4, T_5 and T_7 did not also differ significantly.

Table 4.109. Average feed consumption of cockerels (g) during seventh week of age in different treatments.

Replications	Treatments								
	Average feed consumption of cockerel during seventh week of age(g)								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1	328 3	366 6	410 0	405 0	236 6	110 0	183 3	273.3	283 3
2.	325 0	433 3	366.6	471 6	243.3	256 6	250 0	206.6	333 3
Average	326 05	399 9	388 3	438 3	239 9	223 3	216 6	239 9	308.3

Table 4.110. ANOVA for the data on average feed consumption cockerels (g) during seventh week of age contained in Table 4.109.

Source of variation	d.f	s.s	M.S.S	F.Cal	F. tab	Result	C.D
Treatments	8	101327.21	12665 90	8 07	3 44	S	20.02
Replications	1	1350 27	1350.27	0 86	0.54	NS	
Error	8	12548 37	1568.54	-	-	-	-
Total	17	115225.85	15584.71				

S – Significant NS – Non Significant

Mean feed consumption of cockerels in seventh week of age (g).

Treatments								
T_3	T_1	T_2	T_0	T_8	T_4	T_7	T_5	T_6
438.3	399.9	388.3	326.0	330.7	239.9	239 9	223 3	216.45

4.7.8 Feed consumption of cockerels in eighth week of age (g) :

The data regarding feed consumption in cockerels in 8th week of age are presented in Table 4.111 and ANOVA of the same is given in Table 4.112. The following observations were made :

(1) In general feed consumption per cockerel in 8th week of age ranged from 223.3 to 535.0 g

(2) The average feed consumption per cockerel in 8th week of age in T_0, T_1, T_2, T_3, T_4, T_5 T_6, T_7 and T_8 ranged from 400.0 to 366.6, 401.6 to 468.3, 440.0 to 453.3, 535.0 to 468.3, 333.3 to 390.0, 326.6 to 393.3, 293.3 to 426.6, 300 to 223.3 and 326.0 to 360.0 g, respectively.

(3) The mean feed consumption per cockerel in 8th week of age in T_0, T_1, T_2, T_3, T_4, T_5 T_6, T_7 and T_8 was 383.3, 434.95, 446.15, 501.6, 361.6, 359.9, 359.9, 261.6, 343.3 g., respectively.

(4) The differences in feed consumption per cockerel at 8th week of age between treatments were non significant (Table 4.112).

The perusal of data on feed consumption cockerels in 8th week contained in Table 4.111 indicated that highest feed consumption per bird in 8th weak was recorded in T_3 (501.6) followed by T_2 (446.6), T_1 (434.9), T_0 (383.3), T_4 (361.6), T_5 (359.9), T_6 (359.9), T_8 (343.3) and T_7 (261.6) g. The differences in these were found non significant. inducted thereby non significant effect of treatments on feed consumption of cockerels in 8th week of age.

Table 4.111. Average feed consumption of cockerels (g) during eighth weeks of age in different treatments.

Replications	Treatments								
	Average feed consumption of cockerels during eighth week of age (g)								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
1	400 0	401 6	440 0	535 0	333 3	326 6	293.3	300 0	326 0
2.	366 6	468 3	453 3	468 3	390.0	393 3	426.6	223 3	360 3
Average	383 3	434 9	446 6	501 6	361 6	359.9	359.9	261.6	343 3

Table 4.112. ANOVA for the data on average feed consumption cockerel during eighth week of age contained in Table 4.111.

Source of variation	d.f	s.s	M.S.S	F.Cal	F. tab	Result
Treatments	8	83575.2	10446 9	0 089	3 44	NS
Replications	1	10874 84	10874 84	0.092	3.54	NS
Error	8	935588	116948 49	-	-	-
Total	17	1030038 04	138270.23			

Non- Significant

Mean feed consumption of cockerels during eighth week of age (g).

Treatments

T_3	T_2	T_1	T_0	T_4	T_5	T_6	T_8	T_7
501.6	446.6	434.9	283.3	361.6	359.9	359.9	343.3	261.6

4.7.9 Weekly average feed consumption of cockerels (g).

The data regarding weekly feed consumption of cockerels in different treatments are presented in Table 4.113 and ANOVA of the same is given in Table 4.114. The following observations were made :

(1) The weekly feed consumption per cockerel irrespective of treatment in 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th week of age from 45.1 to 83.0, 69.0 to 143.1, 87.5 to 144.1, 108.3 to 240.5, 120.0 to 243.3, 170 to 321.6, 216.6 to 38.3 and 216.6 to 501 g., respectively.

(2) The mean feed consumption per cockerel, irrespective of treatment in 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th week was 62.11, 88.7, 113 1, 145.4, 173.9, 222.0, 308.8 and 383.0 g., respectively.

(3) The differences in feed consumption of cockerels between weeks were significant.

(4) The mean weekly feed consumption per cockerel in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 174.9, 220.4, 237.6, 271.0, 163.5, 147.06, 148.5, 144.3 and 177.97 g., respectively.

(5) The differences in weekly feed consumption of cockerels between treatments were significant (Table 4.114).

From the perusal of data on weekly feed consumption of cockerels contained in Table 4.113, Figure 4.13 and 4.14, it was noted highest weekly feed consumption per cockerel was recorded in T_3 (271) followed by T_2 (237.6), T_1 (220.4), T_8 (177.9), T_0 (174.0), T_4 (163.5) T_3 (148.5), T_5 (147.0) and T_7 (144.3) and differences in these were found significant,

indicating thereby a significant effect of treatments on the weekly feed consumption of cockerels. T_3 registered significantly more feed consumption than all the treatments the control, T_1 was found at par with T_2 as the differences between these were not significant. The control (T_0) was found at par with T_4, T_5, T_6 T_7 and T_8 as the differences in these were found not significant. T_7 registered significantly less weekly feed consumption than T_1, T_2, T_3 and T_8. When week-wise feed consumption (g) was observed that the highest feed consumption in cockerels was recorded in 8th week (383.0) followed by 7th week (308.8), 6 week (222.0), 5 week (173.9) 4 week (145.4), 3rd week (113.1), 2nd week (88.7) and 1st week (62.1) g. The differences in these were found significant. These results were as expected because feed consumption increased due to increase in growth with age

Table 4.113. Weekly average feed consumption of cockerels (g) in different treatments.

Weeks	Treatments Weekly feed consumption per cockerel (g)									
	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_0	Mean
1.	58.0	83 0	74 8	45 1	6' 3	52.1	60 8	71 6	62.3	62 11
2.	86.0	110 0	143 1	69 0	69 0	74 8	77 5	90 0	80 0	88 7
3.	129 0	144.1	193 1	87 5	75 8	83 5	97 8	106 6	100	113 1
4.	181.1	164 1	240.5	140 0	110 5	108.3	115.8	129 0	120 0	145 4
5.	208 0	243 3	270.0	165 0	120.0	140 0	13' 6	150 0	141.6	173 9
6.	250.0	321.6	306 6	210 0	156 6	175 0	170 0	208 3	200 0	222 0
7.	400 0	388 3	438 3	240 0	223 3	216 6	240.0	308.3	325	308.8
8.	451 0	446 6	501 6	361 6	360 0	338 3	261 6	360 0	366 6	383.0
Mean	220.4	237 6	271.0	163 5	147 0	148 5	144 3	177 9	174 9	-

Table 4.114. ANOVA for the data on average weekly feed consumption of cockerels (g) contained in Table 4.113.

Source of variation	d.f	s.s	M.S.S	F.Cal	F. tab	Result	C.D
Treatments	8	131336 8	16417 1	1 8 49	2 7	S	32 47
Weeks	7	783748	111964	126 15	2 8	S	44 58
Error	56	47702 34	887 54	-	-	-	-
Total	71	962787 14	129268 64				

S – Significant NS – Non Significant

Mean weekly feed consumption of cockerels (g) in treatments

Treatments

T_3	T_2	T_1	T_8	T_0	T_4	T_6	T_5	T_7
271.0	237 6	220 4	177 9	174.4	163 5	148 1	147 0	144 3

Week-wise mean feed consumption of cockerels (g)

W_8	W7	W6	W5	W4	W3	W2	W1
383.0	308 8	222.0	173 9	145.4	113.1	88.7	62 11

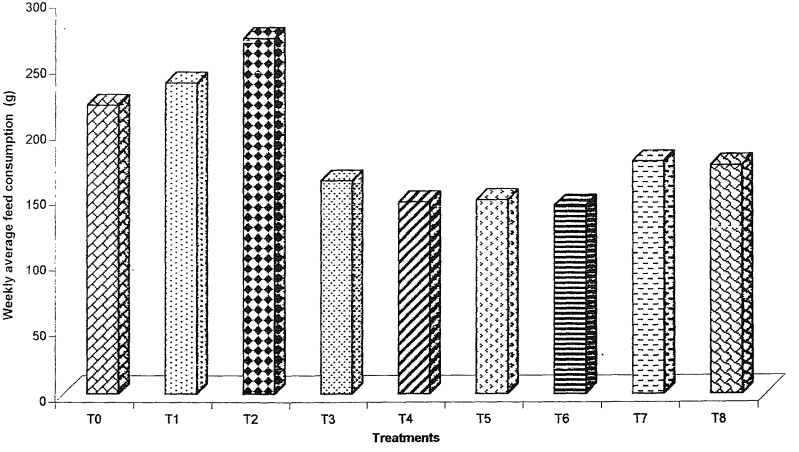


Figure 4.13. Weekly average feed consumption (g) of cockerels in different treatments

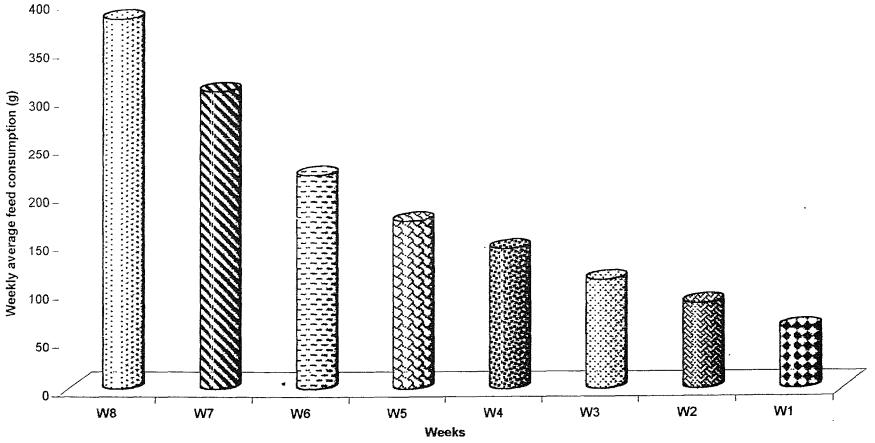


Fig 4.14. Week-wise average feed consumption of cockerels (g) in different treatments

4.8. WEEKLY AVERAGE FEED CONVERSION RATIO (FCR) OF COCKERELS:

Feed conversion ratio (g) in the feed consumption required to attain 1 kg of gain in live weight, it is also called F.C.R. The data regarding weekly F.C.R. of cockerels in different treatments are presented in Table 4.115 and ANOVA of the same is given in Table 4.116. The following observations were made:

(1) Irrespective of treatment, the weekly F.C.R. of cockerel in I, II, III, IV, V, VI, VII, and VIIIth week ranged from 1.48 to 7.66, 1.57 to 5.07, 1.59 to 5.21, 2.10 to 6.30, 1.47 to 3.43, 1.63 to 3.55, 1.16 to 2.94, 2.09 to 5.97, respectively.

(2) The mean weekly F.C.R of cockerels in I, II, III, IV, V, VI, VII, VIII week was 4.42, 3.62, 2.77, 3.52, 2.22, 2.33, 1.85 and 3.96 g., respectively.

(3) The differences in weekly F.C.R. of cockerels between treatments were non significant (Table 4.116).

(4) The mean F.C.R of cockerels irrespective of age in weeks, in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 3.20, 3.59, 3.03, 3.66, 2.75, 2.52, 3.30, 2.71 and 3.02 g., respectively

(5) The differences in the F.C.R of cockerels between treatments were significant (Table 4.116).

The perusal of data on weekly F.C.R. of cockerels of different treatments furnished in Table 4.115, Figure 4.15 and 4.16, indicated that the best F.C.R. in cockerels was observed in T_5 (2.52) followed by T_7

(2.71), T_4 (3.59), T_8 (3 32) T_2 (3.08), T_0 (3 32), T_6 (3.3), T_1 (3 59) and T_3 (3.66). The differences in F.C.R. of cockerels between the treatments were found significant indicating thereby a significant effect of treatments on the F.C.R. of cockerels. The F.C.R. of cockerels in T_4 was found at par with T_5 and T_7. The F.C R of cockerels in control was also at par with T_2 and T_6 The latter treatment also was found at par with T_1 and T_3. Similar the differences F.C.R. of cockerels between T_4, T_7, T_8, and between T_2 and T_8 and also between T_0, T_2 and T_6 were non significant

In general compared to control the T_4, T_5, T_7 and T_8 were found superior as F.C.R was found significantly better, but other treatments viz. T_1, T_2, T_3 and T_6 were found at par with control.

Table 4.115. Weekly average feed conversion ratio (kg) of cockerels in different treatments.

Weeks	Treatments Weekly average feed conversion ratio of cockerels									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1	5.06	4.07	1 48	2 87	5 13	2.34	7 66	5.28	5.96	4 42
2.	5.07	2 97	2.64	2 16	1 57	5.86	4 08	4 60	3 64	3 62
3.	2 64	2 59	3 66	5 21	2 08	1 59	2.53	2 81	1.85	2.77
4	3.54	3.55	3 95	6 30	3.73	2.78	2 31	2.01	3 54	3.52
5	1.81	3 08	2 73	3 43	2 26	1 47	1 71	1 47	2 03	2 22
6.	2.22	3.55	2 65	2 79	1 66	1 63	2 05	1 98	2 18	2 33
7.	1.83	2.94	2.02	2 78	1 16	1.56	1 33	1 48	1.57	1.85
8	3.43	5 97	5 15	3.76	4 09	2.99	4 79	2 09	3 43	3 96
Mean	3.20	3 59	3 03	3 66	2.75	2 52	3.30	2 71	3 02	

Table 4.116. ANOVA for the data weekly feed conversion ratio (kg) of cockerels contained in Table 4.115.

Source of variation	d.f	s.s	M.S.S	F.Cal	F. tab	Result	C.D
Treatments	8	53 68	8 94	6 33	2.1	S	0 33
Weeks	7	9 74	1.31	0 98	2 06	NS	
Error	56	79 13	1.41	-	-	-	-
Total	71	142.55	11 66				

S : Significant NS : Non Significant

Mean weekly feed conversion ratio (kg) of cockerels in treatments

T_5	T_7	T_4	T_8	T_2	T_0	T_6	T_1	T_3
2.52	2.71	2.75	3.02	3.08	3.20	3.30	3.59	3.66

Week-wise feed conversion ratio of cockerels (kg)

W_1	W_8	W_2	W_4	W_3	W_6	W_5	W_7
4.42	3.96	3.62	3.52	2.77	2.33	2.22	1.85

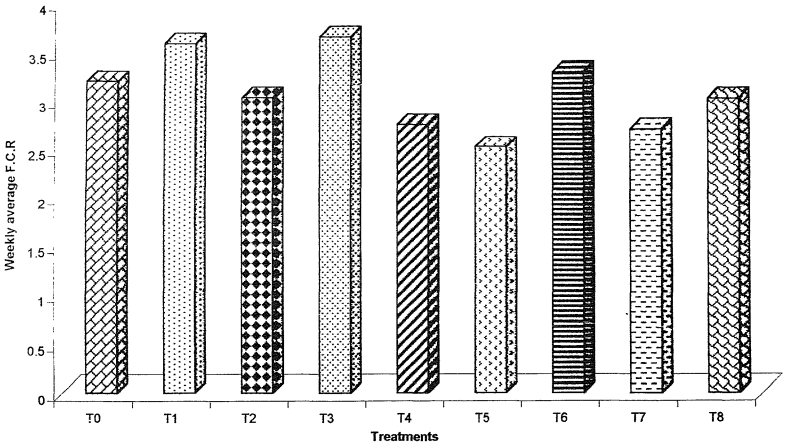


Figure 4.15. Weekly average feed conversion ratio (g) of cockerels in different treatments

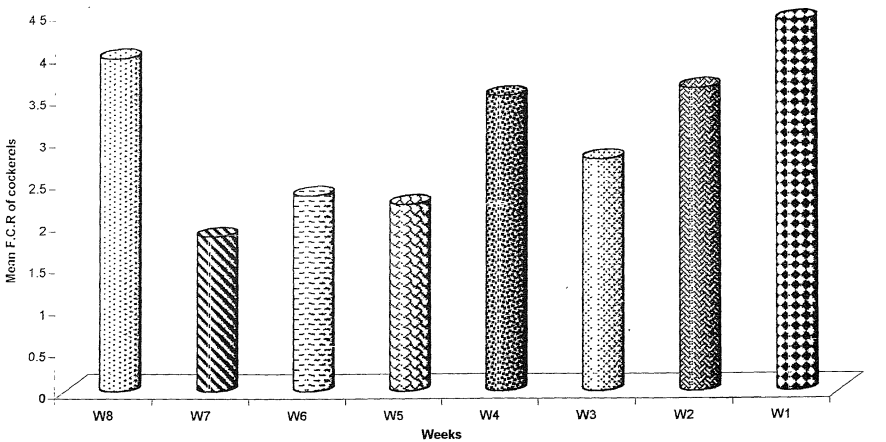


Figure 4.16. Week-wise mean feed conversion ratio (kg) of cockerels in different treatments

4.9. BODY WEIGHT OF LAYER CHICKS (g):

The data regarding body weight of layer chicks from day old to eight weeks of age in different treatments presented in Tables 4.117-4.136.

4.9.1. Body weight of day old layer chicks:

The data regarding body weight of day old chicks randomly distributed in treatments are presented in Table 4.116 and ANOVA of the same is given in Table 4.117. Following observations were made:

1. In general the body weight of day old layer chick ranged from 27-39 g.
2. The body weight of day old chicks in treatments namely T_0, T_1, T_2, T_3, T_4, T_5, T_6 T_7 and T_8 ranged from 30-35, 27-33, 29-33, 30-33, 31-33, 28-33, 29-33, 28-39 and 29-31 g, respectively.
3. The mean body weight of day old layer chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 31.33, 30.33, 31.00, 31.33, 31.66, 30.00, 32.00, 31.66 and 30.16 g, respectively.
4. The differences in body weight of day old layer chicks between treatments were non significant (Table 4.117).

From data on body weight of day old chicks furnished in Table 4.116. It may be noted that in general the body weight of day old chicks ranged from 27-39. The mean highest body weight of day old chicks was recorded 32.00 g in T_6 followed by 31.66 g in T_4, 31.66 g in T_7, 31.00 g in T_3, 31.33 g in T_0, 31.00 g in T_2, 30.33 g in T_1, 30.16 g in T_8 and 30.00 g in T_5. However the differences in these values were found non significant, indicating thereby a proper distribution of chicks in the treatments without bias.

Table 4.117. Average body weight (g) of day old layers in different treatments

Replications	Treatments Average body weight (g) of day old layers									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1	30	33	31	30	32	30	33	28	30	30 77
2.	35	33	32	32	31	30	29	32	31	31.66
3.	30	27	30	32	31	28	32	30	29	29.88
4	31	31	29	33	32	31	34	31	32	31.55
5.	30	28	33	31	33	33	32	39	29	32.00
6.	32	30	31	30	31	28	32	30	30	30 44
Total	188	182	186	188	190	180	192	190	181	186.33
Mean	31.33	30.33	31.00	31 33	31 66	30 00	32 00	31.66	30.16	27.56

Table 4.118. ANOVA for the data on body weight (g) of day old layers contained in Table 4.117.

Source of variation	d.f	s s	M S S	F Value		Resul
				Cal.	Table (5%)	
Treatments	8	23.93	2 99	0 022	2 18	NS
Replication	5	28.72	5 74	0.424	2 45	NS
Error	40	51108 3	135 20			
Total	53	5163 53				

NS – Non-Significant

Mean body weight of day old layers (g)

Treatments

T_6	T_4	T_7	T_3	T_0	T_2	T_1	T_8	T_5
32.06	31.66	31.66	31.33	31 33	31.00	30.33	30.16	30.00

4.9.2. Average body weight of layer chicks (g) at first week of age:

The data regarding body weight of layer chicks of different treatments are presented in Table 4.119 and ANOVA of the same is given in Table 4.120. The following observations were made:

1. Irrespective of treatment, the body weight of layer chicks at first week of age ranged from 38-68 g and overall mean body weight was 52.98 g.
2. The body weight of layer chicks at first week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 51-64, 54-65, 48-64, 55-66, 58-67, 56-67, 42-68, 56-66 and 54-63 g, respectively.
3. The mean body weight of layer chicks at first week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 58.16, 59.16, 57.16, 61.83, 53.16, 61.00, 59.5, 61.00 and 59.5 g, respectively.
4. The differences in body weight of layer chicks at first week of age between treatments were non-significant (Table 4.117).

From the perusal of data contained in Table 4.116, it was observed that irrespective of treatment the body weight of layer chicks ranged from 38-68 g. The highest mean body weight of layer chicks at first week of age was recorded in T_3 (61.83 g) followed by T_5 (61.00 g), T_7 (61.00 g), T_6 (59.5 g), T_8 (59.33 g), T_1 (59.15 g), T_0 (58.15 g), T_2 (57.15 g) and T_4 (53.15 g). However, the differences in these body weights of layer chicks were found significant indicating thereby a significant effect of treatments on body weight of layer chicks at first week of age. Chicks in T_3 registered significantly higher body weight compared to chicks in T_4. The differences in body weight of chicks between other treatments were found non-significant.

Table 4.119. Average body weight (g) of layers at first week of age in different treatments

Replications	Treatments Average body weight (g) of layers at first week									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	56	63	61	55	58	67	64	60	62	60 60
2.	64	61	57	66	42	62	63	66	57	59 77
3.	5	57	52	55	68	56	62	63	60	58 33
4.	58	55	48	66	60	58	68	57	63	59 22
5.	59	54	64	65	53	63	58	64	54	59.33
6.	60	65	61	64	38	60	42	56	60	56 22
Total	348	354	342	371	318	366	357	366	356	353.55
Mean	58.15	59 13	57 15	61.83	53.15	61.00	59.5	61 00	59 5	52.98

Table 4.120. ANOVA for the data on body weight of layers at first week of age (g) contained in Table 4.119.

Source of variation	d.f	s.s	M S S	F. Value		Result	C.D
				Cal.	Table (5%)		
Treatments	8	326 67	40.83	2.40	2.18	S	5 68
Replications	5	105 03	21 00	1 23	2.45	NS	-
Error	40	682 01	17 05				
Total	53	1113 71					

S = Significant NS = Non-Significant

Mean body weight of layers at first week of age (g)

Treatments

T_3	T_5	T_7	T_6	T_8	T_1	T_0	T_2	T_4
61.83	61.00	61.00	59.5	59.33	59.15	58.16	57.16	53.16

4.9.3. Average body weight of layer chicks (g) at second week of age:

The data regarding body weight of layer chicks at second week of age in different treatments are presented in Table 4.121 and ANOVA of the same is given in Table 4.122. The following observations were made:

1. Irrespective of treatment, the body weight of layer chicks of second week of age ranged from 60-124 g (mean 102.25 g).
2. The average body weight of layer chicks at second week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 99-105, 97-113, 79-112, 97-110, 64-110, 103-112, 60-106, 92-112, 99-124 g, respectively.
3. The mean body weight of layer chicks at second week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 103, 102.67, 101.16, 104.5, 94.16, 110, 94.5, 100.34 and 110 g, respectively.
4. The differences in body weight of layer chicks at second week of age between treatments were significant (Table 4.122).

From the data contained in Table 4.121, it was observed that the highest mean body weight of layer chicks of second week of age was recorded in T_8 (110 g) followed by T_5 (110 g), T_3 (104.5 g), T_0 (103 g), T_1 (102.67 g), T_2 (101.16 g), T_7 (100.34 g), T_6 (94.5 g) and T_4 (94.16 g). However, the differences in these values of layer chicks of second week of age were found to be significant indicating thereby a significant effect of treatments on body weight. Weight of chicks in T_8 were at par with chicks of control and with T_1, T_2, T_3, T_5, T_7, but were significantly higher than chicks in T_4 and T_6.

Table 4.121. Average body weight (g) of layers at second week of age in different treatments

Replications	Treatments									
	Average body weight (g) of layers at second week									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	100	101	112	97	105	119	106	92	100	103 56
2	110	98	103	108	87	109	99	108	108	103.34
3.	99	101	106	103	110	103	103	103	120	105 34
4.	105	97	79	110	107	105	103	92	124	102 44
5.	101	113	103	106	92	112	96	112	99	103.78
6	103	106	104	103	64	112	60	95	109	95 12
Total	618	616	607	627	565	660	567	602	660	613 55
Mean	103	102 67	101.16	104.5	94.16	110	94 5	100.34	110	102.25

Table 4.122. ANOVA for the data on body weight of layers at second week of age (g) in different treatments contained in Table 4.121.

Source of variation	d.f	s s	M S S	F Value		Result	C.D
				Cal.	Table (5%)		
Treatments	8	1535 71	191.97	2 21	2 18	S	12 83
Replication	5	591 5	118.3	1.36	2.45	NS	-
Error	40	3465.16	86 63				
Total	53	5592 37					

S – Significant NS – Non-Significant

Mean body weight of layers at second week of age (g)

Treatments

T_8	T_5	T_3	T_0	T_1	T_2	T_7	T_6	T_4
110	110	104.5	103	102.67	101.16	100.34	94.5	94.16

4.9.4. Average body weight of layer chicks (g) at third week of age:

The data regarding body weight of layer chicks of different treatments at third week age are presented in Table 4.123 and ANOVA of the same is given in Table 4.124. The following observations were made

1. Irrespective of treatment, the body weight of layer chicks at third week of age ranged from 101 to 180 g (mean 154.82g).
2. The mean body weight of layer chicks at third week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 157.08, 150.34, 154 5, 160.67, 146, 167.16, 146.3, 151.5 and 159.67 g, respectively.
3. The average body weight of layer chicks at third week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 153-160, 142-161, 120- 178, 151-178, 110-162, 154-180, 101-171, 139-169 and 140-170 g, respectively.
4. The differences in body weight of layer chicks at third week of age due to treatments were non-significant (Table 4.124).

From the perusal of data contained in Table 4.123, it was noted that the highest mean body weight of layer chicks at third week of age was recorded in T_5 (167.16 g) followed by T_3 (160.67 g), T_8 (159.67 g), T_0 (157.08 g), T_2 (154.5 g), T_7 (151.5 g), T_1 (150.34 g), T_6 (146.5 g) and T_4 (146 g). However, the differences in these values of layer chicks of third week of age were found to be non-significant indicating thereby a non-significant effect of treatments on body weight of layer chicks at three week of age.

Table 4.123. Average body weight (g) of layers at third week age in different treatments

Replications	Treatments									
	Average body weight (g) of layers at third week									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	153	143	160	151	160	180	171	139	169	158.45
2.	158	151	156	178	135	160	154	156	140	154.23
3.	160	157	150	162	162	154	158	157	150	156.67
4.	159	142	120	152	159	163	153	143	170	151.23
5.	154.5	161	163	162	150	176	142	169	159	159.62
6.	158	148	178	159	110	170	101	145	170	148.78
Total	942.5	902	927	964	876	1003	879	909	958	928.95
Mean	157.08	150.34	154.5	160.67	146	167.16	146.5	151.5	159.67	154.82

Table 4.124. ANOVA for the data on body weight of layers at third week of age (g) in different treatments contained in Table 4.123.

Source of variation	d.f	s.s	M.S S	F. Value		Result
				Cal.	Table (5%)	
Treatments	8	2361.04	295.13	0.20	2.18	NS
Replication	5	803.02	160.60	0.10	2.45	NS
Error	40	59014.52	1475.36			
Total	53	62178.58				

NS – Non-Significant

Mean body weight of layers at third week of age (g)

Treatments

T_6	T_4	T_7	T_3	T_0	T_2	T_1	T_8	T_5
167.16	160.67	159.67	157.08	154.5	151.5	150.34	146.5	146

4.9.5. Average body weight (g) of layer chicks at four week of age:

The data regarding body weight of layer chicks at four week of age in different treatments are presented in Table 4.125 and ANOVA of the same is given in Table 4.126. The following observations were made.

1. Irrespective of treatment, the body weight of layer chicks at four week of age ranged from 173 to 260 g (mean 226.67 g).
2. The average body weight of layer chicks at four week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 200-247, 210-235, 184-255, 216-248, 175-243, 227-260, 173-246, 198-254 and 200-254 g, respectively.
3. The mean body weight of layer chicks at four week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 230.5, 221.34, 220.34, 232.67, 215.34, 243.34, 219.84, 225.84 and 230.84 g, respectively.
4. The differences in body weight at layer chicks at four week of age between treatments were non-significant (Table 4.126).

From the perusal of data contained in Table 4.125, it was noted that irrespective of treatment, the body weight of layer chicks of four week of age ranged from 184-260 g. The highest mean body weight of layer chicks was recorded in T_4 (243.34 g) followed by T_3 (232.67 g), T_8 (230.84 g), T_0 (230.5 g), T_7 (225.84 g), T_1 (221.34 g), T_2 (220.34 g), T_6 (219.84 g) and T_4 (215.34 g). However, the differences in these values of layer chicks at four week of age were found to be non-significant indicating thereby a non-significant effect of treatments on body weight of layer chicks at four week of age.

Table 4.125. Average body weight (g) of layers at four week of age at different treatments

Replications	Treatments Average body weight (g) of layer at four week									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	216	213	229	216	243	260	246	222	247	232 45
2.	247	210	223	235	198	227	221	236	210	223
3.	250	224	216	234	240	230	230	219	200	227
4.	200	222	184	221	219	233	233	226	254	221 34
5.	230	224	215	248	217	260	216	254	231	232 45
6.	240	235	255	242	175	250	173	198	243	223 45
Total	1383	1328	1322	1396	1292	1460	1319	1355	1385	1360
Mean	230.5	221 34	220.34	232 67	215 34	243 34	219.84	225 84	230.84	226.67

Table 4.126. ANOVA for the data on body weight of layers at four week of age (g) in different treatments contained in Table 4.125.

Source of variation	d.f	s.s	M S S	F Value		Result
				Cal.	Table (5%)	
Treatments	8	3541 35	442.67	0.31	2.18	NS
Replication	5	1107 96	221 59	0 15	2 45	NS
Error	40	55476 69	1386.91			
Total	53					

NS – Non-Significant

Mean body weight of layers at four week of age (g)

Treatments

T_5	T_3	T_8	T_0	T_7	T_1	T_2	T_6	T_4
243.34	232.67	230.84	230.5	225.84	221.34	220.34	219.84	215.34

4.9.6. Average body weight (g) of layer chicks at five weeks of age:

The data regarding body weight of layer chicks at five weeks of age in different treatments are presented in Table 4.127 and ANOVA of the same is given in Table 4.128. The following observations were made:

1. Irrespective of treatment, the body weight of layer chicks at five weeks of age ranged from 241 to 352 g (mean 313.67 g).
2. The average body weight of layer chicks at five weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 283-332, 310-343, 298-352, 314-349, 280-349, 300-345 241-345, 276-337 and 246-348 g, respectively.
3. The mean body weight of layer chicks at five weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 308.17, 325.5, 312.67, 332.5, 318.34, 316.67, 295.5, 298.34 and 315.34 g, respectively.
4. The differences in body weight of layer chicks at five weeks of age between treatments were non-significant (Table 4.128).

From the perusal of data contained in Table 4.127, it was evident that the highest mean body weight of layer chicks was recorded in T_3 (332.5 g) followed by T_1 (325.5 g), T_4 (318.34 g), T_5 (316.67 g), T_8 (315.34 g), T_2 (312.67 g), T_0 (308.17 g), T_7 (298.34 g) and T_6 (395.5 g). However, the differences in these body weights of layer chicks were found to be non-significant indicating thereby a non-significant effect of treatments on body weight of layer chicks at five weeks of age. This indicated that all test rations were at par.

Table 4.127. Average body weight (g) of layers at five week of age in different treatments

Replications	Treatments Average body weight (g) of layer chicks at five weeks									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1	283	310	321	320	349	341	345	276	246	310 12
2.	332	300	316	343	293	302	301	300	300	309 76
3.	300	338	320	323	346	309	308	303	340	320 78
4	299	323	269	314	328	303	299	298	348	309 00
5.	315	343	298	349	314	345	279	337	328	323.11
6.	320	339	352	346	280	300	241	276	330	309.34
Mean	308.17	325.5	312.67	332.5	318.34	316.67	295.5	298 34	315 34	313 67

Table 4.128. ANOVA for the data on body weight of layers at five week of age (g) in different treatments contained in Table 4.127.

Source of variation	d f	s.s	M.S S	F Value		Result
				Cal.	Table (5%)	
Treatments	8	6748 01	843.50	1.89	2.18	NS
Replications	5	1880 65	376 13	0.84	2 45	NS
Error	40	17801 34	445.03			
Total	53	26430 00				

Mean body weight of layers at five weeks of age (g)

Treatments

T_3	T_1	T_4	T_5	T_8	T_2	T_0	T_7	T_6
332.5	325.5	318.34	316.67	315.34	312.67	308.17	298.34	295.5

4.9.7. Average body weight (g) of layer chicks at six weeks of age:

The data regarding body weight of layer chicks at six weeks of age in different treatments are presented in Table 4.129 and ANOVA of the same is given in Table 4.130. The following observations were made:

1. Irrespective of treatment, the body weight of layer chicks at six weeks of age ranged from 355 to 478 g (mean 469.40 g).
2. The average body weight of layer chicks at six weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 395-410, 414-456, 368-450, 417-478, 385-472, 398-460, 355-404, 370-443 and 407-476 g, respectively.
3. The mean body weight of layer chicks at six weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 401.7, 432.3, 407.33, 439.67, 430.83, 427.5, 404.67, 402.16 and 439.16 g, respectively.
4. The differences in body weight of layer chicks of six weeks of age between treatments were non-significant (Table 4.130).

The perusal of data contained in Table 4.129 indicated that the highest mean body weight of layer chicks was recorded in T_3 (439.67 g) followed by T_8 (439.33 g), T_1 (432.3 g), T_4 (430.83 g), T_5 (427.5 g), T_2 (407.33 g), T_6 (464.67 g), T_7 (402.16 g) and T_0 (401.70 g). However, the differences in these body weights of layer chicks were found to be significant indicating thereby a significant effect of treatments on body weight of layer chicks at six weeks of age. Chicks of control and T_7 registered significantly less body weight than chicks of other treatments. The differences in body weight of chicks between T_1, T_2, T_3, T_4, T_5, T_6 and T_8 were not significantly different.

Table 4.129. Average body weight (g) of layers at six week of age in different treatments

Replications	Treatments Average body weight (g) of layer chicks at six week									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	395	423	426	420	464	460	464	376	463	432.33
2.	400	415	407	434	400	407	411	425	407	417.22
3.	400	438	400	435	472	426	408	394	408	420 11
4.	405	414	368	417	440	398	404	405	476	415 78
5.	400	449	393	378	424	444	386	443	438	430 89
6.	410	456	450	454	385	430	355	370	444	416.67
Mean	401.7	432.3	407 33	439 67	430 83	427.5	404.67	402.16	439.33	469 40

Table 4.130. ANOVA for the data on body weight of layers at six weeks of age (g) in different treatments contained in Table 4.129.

Source of variation	d.f	s s	M.S S	F. Value		Result	C.D
				Cal	Table (5%)		
Treatments	8	136132.84	17016 60	2 64	2.18	S	36 20
Replication	5	1255 48	251 09	2 64	2 45	S	44 6
Error	40	257416 78	6435 41				
Total	53	394805 10					

S = Significant

Mean body weight of layers at six week of age (g)

Treatments

T_3	T_8	T_1	T_4	T_5	T_2	T_6	T_7	T_0
439.67	439.33	432.3	430.83	427.5	407 33	404 67	402.16	401 7

4.9.8. Average body weight (g) of layer chicks at seven weeks of age:

The data regarding body weight of layer chicks of different treatments at 7 week age are presented in Table 4.131 and ANOVA of the same is given in Table 4.132. The following observations were made:

1. Irrespective of treatments, the body weight of layer chicks at seven weeks of age ranged from 440-657 g (mean 535.31 g).
2. The average body weight of layer chicks at seven weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 492-535, 483-629, 440-657, 487-610.02, 479-598, 478-650.6, 488-566, 462-616 and 500-628.38 g, respectively.
3. The mean body weight of layer chicks at seven weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 511.2, 546.0, 518.0, 556.67, 549.43, 545.10, 523.07, 519.66, 548.73 g, respectively.
4. The differences in body weight of layer chicks at seven weeks of age between treatments were non-significant (Table 4.132).

The perusal of data contained in Table 4.131 indicated that highest mean body weight of layer chicks at seven weeks of age was recorded in T_3 (556.67 g) followed by T_4 (549.43 g), T_8 (548.73 g), T_1 (546.0 g), T_5 (545.10 g), T_6 (523.07 g), T_7 (519.66 g), T_2 (518 g) and T_0 (511.2 g). However, the differences in these values of body weight of layer chicks were found non-significant indicating thereby a non-significant effect of treatments on body weight of layer chicks at seven weeks of age.

Table 4.131. Average body weight (g) of layers at seven week of age in different treatments.

Replications	Treatments Average body weight (g) of layer chicks at seven week									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	492	493	515	487	553	529	558	462	558	516 33
2.	535	483	485	513	479	478	493	505	500	496 77
3.	500	512	440	500	557	509	488	469	520	499 44
4	503.64	585	453	580	538	485	499	485	571	522 18
5.	508	574	558	650	598	619	566	616	515	578 22
6.	529	629	657	610.02	571.58	650 6	534.42	580 96	628 38	598 99
Mean	511.2	546.0	518 0	556.67	549.43	545 10	523.07	519.66	548.73	535.31

Table 4.132. ANOVA for the data on body weight of layers at seven week of age (g) in different treatments contained in Table 4.131.

Source of variation	d f	s.s	M S.S	F Value		Result	C.D
				Cal	Table (5%)		
Treatments	8	13907.81	1738.47	1 12	2.18	NS	-
Replication	5	82807	16561.4	10.70	2 45	S	43.08
Error	40	61861 81	1546 54				
Total	53	158576.62					

S = Significant NS = Non-Significant

Mean body weight of layers at seven week of age (g)

Treatments

T_3	T_8	T_1	T_4	T_5	T_2	T_6	T_7	T_0
556.67	549.43	548.73	546.0	545.10	523.07	519.66	518	511.2

4.9.9. Average body weight (g) of layer chicks at eight weeks of age:

The data regarding body weight of layer chicks of different treatments at eight weeks of age are presented in Table 4.133 and ANOVA of the same is given in Table 4.134. The following observations were made:

1. Irrespective of treatment, the body weight of layer chicks at eight weeks of age ranged from 520-782 g (mean 654.59 g).
2. The average body weight of layer chicks at eight weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 545-726.8, 645-763.6, 615-692.2, 640-718, 545-748, 550-782, 635-670, 520-724.16 and 575-738.98 g, respectively.
3. The mean body weight of layer chicks at eight weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 621.8, 664.6, 634.2, 672.87, 667.03, 662.5, 648.67, 646.36, 673.33 g, respectively.
4. The differences in body weight of layer chicks at eight weeks of age between treatments were non-significant (Table 4.134).

The perusal of data contained in Table 4.133 indicated that highest mean body weight of layer chicks at eight weeks of age was recorded in T_8 (673.33 g) followed by T_3 (372.87 g), T_4 (667.03 g), T_1 (664.6 g), T_5 (662.5 g), T_6 (648.67 g), T_7 (646.36 g), T_2 (634.2 g) and T_0 (621.8 g). However, the differences in these values of body weight of layer chicks were found non-significant indicating thereby a non-significant effect of treatments on body weight of layer chicks at eight weeks of age.

Table 4.133. Average body weight (g) of layers at eight week of age in different treatments.

Replications	Treatments Average body weight (g) of layer chicks at eight week									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	576	560	580	640	624	594	643	520	625	595 77
2.	624	660	648	672	545	550	670	662	575	622 88
3.	576	676	650	657	748	678	650	625	650	656.66
4.	545	645	620	650	704	656	654	652	728	650.44
5.	683	683	615	718	664	715	635	695	678	678.44
6.	726.8	763.6	692.2	700.22	717.18	782	640.02	724.16	738 98	720.57
Mean	621.8	664.6	634.2	672.87	667.03	662.5	648.67	646.36	673.33	654.59

Table 4.134. ANOVA for the data on body weight of layers at eight week of age (g) in different treatments contained in Table 4.133.

Source of variation	d.f	s s	M.S.S	F Value		Result	C.D
				Cal.	Table (5%)		
Treatments	8	15580 45	1947 55	1 75	2.18	NS	-
Replication	5	52022 56	10464 51	9 36	2 45	S	36 51
Error	40	44419 64	1110 49				
Total	53	112022 65					

S = Significant NS = Non-Significant

Mean body weight of layers at eight week of age (g)

Treatments

T_8	T_3	T_4	T_1	T_5	T_6	T_7	T_2	T_0
673.33	672.87	667.03	664.6	662.5	648.67	646.36	634.2	621.8

4.9.10. Weekly average body weight of layer chicks:

The data regarding weekly body weight of layer chicks are presented in Table 4.135 and ANOVA of the same is given in Table 4.136. Following observations were made:

1. Irrespective of treatment, the average body weight of layer chicks at the age of one, two, three, four, five, six, seven and eight weeks ranged from 53.16-61.83, 94.16-110, 146-167.16, 219.84-315.34, 295.5-332.5, 401-439.67, 511.2-556.67 and 621.8-673.33 g, respectively.

2. The mean body weight of layer chicks irrespective of treatment, at one, two, three, four, five, six, seven and eight weeks of age was 58.9, 102.4, 154.80, 237.77, 313.67, 420.61, 535.31, and 580.98 g, respectively.

3. The average body weight of layer chicks at eight weeks of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 621.4, 664.6, 634.2, 672.87, 667.03, 662.5, 648.67, 646.36 and 673.33 g, respectively.

4. The mean body weight of layer chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 298.95, 312.72, 300.67, 320.17, 321.16, 316.35, 299.00, 300.63 and 317.07 g, respectively.

5. The differences in body weight of layer chicks between treatments as well as age in weeks were non-significant. (Table-4.136).

From the perusal of data contained in Table-4.135 and Fig. 4.17, 4.18, it was observed that the layer chicks of T_4 registered highest mean body weight (321.78 g) followed by T_3 (320.17 g), T_8 (317.87 g), T_5 (316.35 g), T_1 (312.72 g), T_2 (300 67 g), T_4 (300 63 g), T_6 (299.0 g) and T_0 (298.5 g). Since the differences in these values of body weight were found non significant, it indicated a non-significant effect of treatments on weekly body weight of layer chicks.

Table 4.135. Weekly average body weight (g) of layers in different treatments.

Weeks	Treatments Weekly average body weight [g] of layers									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	58.16	59.16	57 16	61.83	53 16	61.00	59 5	61.00	59 33	58 9
2.	103.0	102.67	101.16	104.5	94.16	110.0	94.5	100.24	110.0	102 2
3.	157 08	150.34	154 5	160.67	146.0	167.16	146.3	151.5	159.67	154.80
4.	230.5	221.24	220.34	232.67	315.34	243 34	219.84	225 84	230.34	237.77
5.	308.17	325.5	312.67	332.5	318.34	316.67	295.5	298.34	315 34	313.67
6.	401.7	432.3	407.33	439.67	430 83	427.5	40[illegible]67	402.16	439.33	420.67
7.	511.2	546.0	518.0	556.67	549 43	545.10	52[illegible]07	519.66	548.73	535.31
8.	621.8	664.6	634.2	672 87	667.03	662.5	646.67	646.36	673 33	580 95
Mean	298.95	312.72	300.67	320 17	321.78	316.35	29[illegible].00	300.63	317.07	309.70

Table 4.136. ANOVA for the data on weekly average body weight of layers (g) contained in Table 4.135.

Source of variation	d f	s s	M.S S	F. Value		Result
				Cal.	Table (5%)	
Treatments	8	19715 63	2464 45	0.08	2 7	NS
Replications	7	2677191	382455.85	12 44	2.8	S (C.D. =262.32)
Error	56	153605.6	30721.12			
Total	71	2850512 2				

S = Significant NS = Non-Significant

Weekly mean body weight of layers (g) in treatments

Treatments

T_4	T_3	T_8	T_5	T_1	T_2	T_7	T_2	T_0
321.78	320.17	317.07	316.35	312.72	300.67	300.63	299.00	298.95

Week wise- mean body weight of layers (g)

W_8	W_7	W_6	W_5	W_4	W_3	W_2	W_1
580.98	535.31	420.61	313.67	237.71	154.80	102.2	58 9

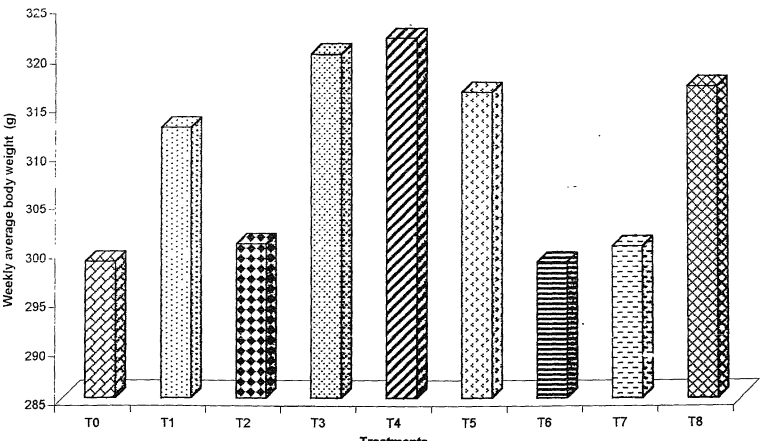


Figure 4.17. Weekly average body weight (g) of layers in different treatments

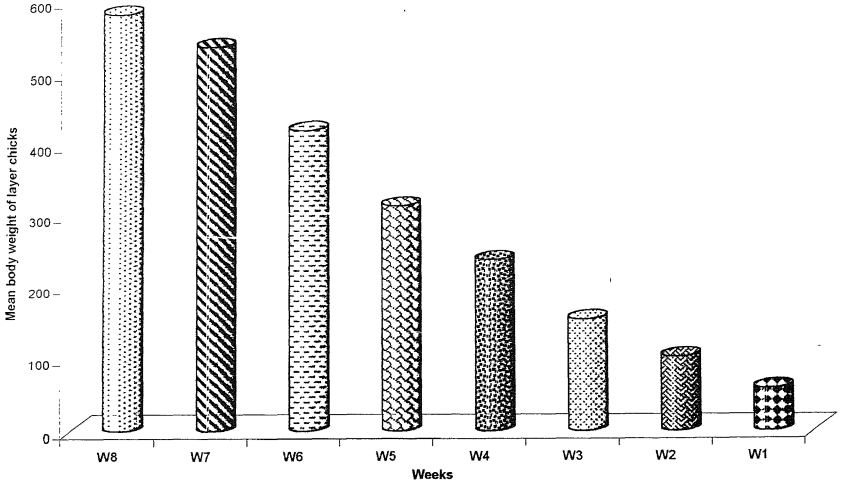


Figure 4.18. Week-wise mean body weight (g) of layers in different treatments

4.10. WEIGHT GAIN OF LAYER CHICKS (g):

The data on weight gain of layer chicks are furnished in Tables 4.137 – 4.154.

4.10.1. Weight gain in layer chicks during first week of age:

The data regarding weight gain of layer chicks in different treatments, viz. T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 are presented in Table 4.137 and ANOVA of the same is given in the Table 4.138. Following observations were made:

1. In general, weight gain of layer chicks during first week of age-ranged from 18-38 (mean 28.64).
2. The weight gain in layer chicks in first week in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 22-30, 24-36, 19-31, 23-34, 11-38, 27-37, 10-34, 26-35 and 25-31 g.
3. The mean weight gain in layer chicks in T_0, T_1, T_2, T_3,.T_4, T_5, T_6, T_7, and T_8, during first week of age was 27.16, 30.5, 26.16, 30.0, 25.33, 31, 27.5, 31 and 29.16 g, respectively.
4. The differences in weight gain of layer chicks between treatments were non significant (Table 4.138).

From the data furnished in Table 4.137, it may be noted that broilers of T_5 in first week of age registered highest weight gain (31.0) followed by layer chicks in T_7 (31.0), T_3 (30.0 g), T_1 (30.5 g), T_6 (27.5 g), T_8 (29.16 g), T_0 (27.16 g) and T_2 (26.16 g) and T_4 (25.33). Since differences in weight gain of layer chicks were found non-significant, it indicated a non-significant effect of treatments on weight gain of layer chicks, which showed that all test rations were at par.

Table 4.137. Weight gain (g) of layers during first week of age in different treatments.

Replications	Treatments Average weight gain (g) in layer chicks during first week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	26	30	30	25	26	37	31	32	32	29 88
2.	29	28	25	31	11	32	34	34	26	27.77
3.	22	30	22	23	37	28	30	33	31	28.44
4.	27	24	19	33	38	27	34	26	31	28 77
5	29	36	31	34	20	30	26	35	25	29 55
6.	30	35	30	34	20	32	10	26	30	27 44
Mean	27 16	30.50	26.16	30.0	25 33	31 0	27 50	31.0	29 16	28 64

Table 4.138. ANOVA for the data on weight gain (g) in layers during first week of age contained in Table 4.137.

Source of variation	d.f	s s	M S S	F. Value		Result
				Cal.	Table (5%)	
Treatments	8	223 45	27.93	0.74	2.18	NS
Replication	5	41.62	8 32	0.002	2.45	NS
Error	40	1497.24	37.43			
Total	53	1762 32				

NS = Non-Significant

Mean weight gain in layers in first week of age (g)

Treatments

T_5	T_7	T_3	T_1	T_6	T_8	T_0	T_2	T_4
31	31	30	30.5	29.16	27.5	27.16	26.16	25.33

4.10.2. Weight gain of layer chicks (g) during second week of age:

The data regarding weight gain of layer chicks in treatments are presented in Table 4.139 and ANOVA of the same is given in Table 4.140. The following observations were made:

1. In general, weight gain of layer chicks during second week of age-ranged from 18-60 (mean 43.16 g.).

2. The weight gain in layer chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 42-47, 37-49, 31-54, 39-48, 26-47, 47-50, 18-42,32-48 and 38-60 g, respectively

3. The mean weight gain in layer chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8, during second week of age was 44.83, 41.83, 44.0, 43.16, 41.00, 48-66, 35.0, 39-33 and 50.66 g, respectively.

4. The differences in weight gain of layer chicks between treatments were significant (Table 4.140).

From the data furnished in Table 4.139, it may be noted that layer chicks of T_8 registered highest weight gain (50.66) followed by layer chicks in T_5 (48.66), T_0 (44.83 g), T_2 (44.0 g), T_3 (43.16 g), T_1 (41.83 g), T_4 (41.0 g) and T_7 (39.33 g) and T_6 (35 g). Since differences in weight gain of layer chicks during second week were found significant, it indicated a significant effect of treatments on the body weight of layer chicks. The layer chicks of T_8 (50.66) registered significantly higher weight gain than weight gain of layer chicks in T_4,

T_7 and T_6. The differences in weight gain in layer chicks between T_1, T_4, T_3, T_2. T_0 and T_5 were non significant Similarly the differences in gain weight of layer chicks between T_1, T_2, T_3, T_4, T_7 and T_0, were non significant. The layer chicks of T_8, T_5, T_0, T_2, T_3 and T_1 also registered the non-significant differences in the weight gain, being at par.

Table 4.139. Weight gain (g) of layers during second week of age in different treatments.

Replications	Treatments weight gain (g) in layer chicks during second week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	44	38	51	42	47	52	42	32	38	42 88
2.	46	37	46	45	45	47	36	42	51	43 88
3	47	44	54	48	42	47	41	40	60	47 00
4.	47	42	31	44	47	47	35	35	61	43 22
5.	42	49	39	41	39	49	38	48	45	43.33
6	43	41	43	39	26	50	18	39	49	38.66
Mean	44.83	41.83	44.00	43.16	41.00	48.66	35.0	39 33	50.66	43.16

Table 4.140. ANOVA for the data on weight gain (g) in layers during second week of age contained in Table 4.139.

Source of variation	d.f	s s	M S S	F. Value		Result	C.D
				Cal.	Table (5%)		
Treatments	8	1066 96	133 37	3 64	2.18	S	8 34
Replications	5	320 16	104 03	2.84	2.45	S	9.37
Error	40	1464 38	36 60				
Total	53	2851 5					

S = Significant

Mean weight gain in layers at second week of age (g)

Treatments

T_8	T_5	T_0	T_2	T_3	T_1	T_4	T_7	T_6
50.66	48.66	44.83	44.0	43.16	41.83	41.00	39.33	35.0

4.10.3. Weight gain of layer chicks (g) during third week of age:

The data regarding weight gain of layer chicks during third week of age in different treatments, viz. T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 are presented in Table 4.141 and ANOVA of the same is given in the Table 4.142. Following observations were made:

1. In general, weight gain of layer chicks during third week of age-ranged from 30-74 g.
2. The weight gain in layer chicks during third week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 48-61, 42-56, 41-74, 42-70, 48-52, 51-64, 41-65,47-57 and 30-69 g, respectively.
3. The mean weight gain in layer chicks during third week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8, was 54, 47.66, 53.33, 56.16, 51 83, 57.5, 52, 51.16 and 49.66 g, respectively.
4. The overall mean weight gain of layer chicks, irrespective of treatment, during third week of age was 52.58 g.
5. The differences in weight gain of layer chicks due to treatments were non-significant (Table 4.142).

The perusal of data on weight gain of layer chicks contained in Table 4.141, indicated that highest mean weight gain in layer chicks was recorded in T_5 (57.5 g) followed by T_3 (56.16 g), T_0 (54.0 g), T_2 (53.33 g), T_6 (52.0 g), T_4 (51.83 g), T_7 (51.16 g), T_8 (49.66 g) and T_1 (47.66 g). The differences in these values were found non-significant, indicating thereby non-significant effect of treatments.

Table 4.141. Weight gain (g) in layers during third week of age in different treatments.

Replications	Treatments Weight gain (g) in layer chicks during third week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	53	42	48	54	55	61	65	47	69	54.88
2.	48	53	53	70	48	51	55	48	32	50 88
3.	61	56	44	59	52	51	55	54	30	51 33
4.	54	45	41	42	52	58	50	51	46	48 77
5.	53	48	60	56	58	64	46	57	60	55 77
6.	55	42	74	56	46	60	41	50	61	53.88
Mean	54	47 66	53.33	56 16	51 83	57 50	52	51.16	49 66	52 58

Table 4.142. ANOVA for the data on weight gain (g) in layers during third week of age contained in Table 4.141.

Source of variation	d f	s.s	M.S.S	F Value		Result
				Cal.	Table (5%)	
Treatments	8	451.0	56.37	0.73	2.18	NS
Replications	5	325.25	65.05	0 85	2.45	NS
Error	40	3058.83	76.47			
Total	53	3835.08				

NS = Non-Significant

Mean weight gain in layer chicks at third week of age (g)

Treatments

T_5	T_3	T_0	T_2	T_6	T_4	T_7	T_8	T_1
57.5	56.16	54	53.33	52	51.83	51.16	49.61	47.66

4.10.4. Weight gain of layer chicks (g) during fourth week of age:

The data regarding weight gain of layer chicks during fourth week of age in different treatments, viz. T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 are presented in Table 4.143 and ANOVA of the same is given in the Table 4.144. Following observations were made:

1. In general, weight gain of layer chicks during fourth week of age-ranged from 41-89 g.
2. The weight gain in layer chicks during fourth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 41-89, 59-87, 52-77. 57-83. 65-83, 67-84, 67-80, 53-85, and 50-84 g, respectively.
3. The mean weight gain in layer chicks during fourth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8, was 73.41, 74.33, 64.83, 72.00, 69.33, 76.16, 73.33, 74.33, and 71.11g, respectively.
4. The overall mean weight gain of layer chicks, irrespective of treatment, during fourth week of age was 72.0 g.
5. The differences in weight gain of layer chicks due to treatments were non-significant (Table 4.144).

The perusal of data on weight gain of layer chicks in Table 4.143, it was noted that layer chicks of T_5 registered highest weight gain (76.16) followed by the layer chicks in T_7 (74.33 g), T_1 (74.33 g), T_0 (73.41 g), T_6 (73 33 g), T_3 (72.00 g), T_8 (71.66 g), T_4 (69.33 g) and T_2 (64.83 g). The differences in weight gain were found non significant indicating a non significant effect of treatments on the weight gain of layer chicks of different treatments during fourth week of age.

Table 4.143. Weight gain (g) in layers during fourth week of age in different treatments.

Replications	Treatments weight gain (g) in layer chicks during fourth week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	63	70	69	65	83	80	75	83	78	74
2.	89	59	67	57	63	67	67	80	70	68 77
3.	90	67	60	72	78	76	72	62	50	69 60
4.	41	80	64	69	60	70	80	83	84	70 11
5.	75.5	83	52	86	67	84	74	85	72	75 36
6.	82	87	77	83	65	80	72	53	73	74.66
Mean	73.41	74 33	64.83	72.00	69 33	76 16	73.33	74 33	71 11	72 09

Table 4.144. ANOVA for the data on weight gain (g) in layers during fourth week of age contained in Table 4.143.

Source of variation	d f	s s	M.S.S	F. Value		Result
				Cal.	Table (5%)	
Treatments	8	546.6	68.32	0.525	2.18	NS
Replications	5	377.35	75.47	0.580	2.45	NS
Error	40	5197.79	129.94			
Total	53	6121.74				

NS = Non-Significant

Mean weight gain in layers at fourth week of age (g)

Treatments

T_5	T_7	T_1	T_0	T_6	T_3	T_8	T_4	T_2
76.16	74.33	74.33	73.41	73.33	72.00	71.66	69.33	64.83

4.10.5. Weight gain of layer chicks (g) during fifth week of age:

The data regarding weight gain of layer chicks in different treatments, viz. T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 are presented in Table 4.145 and ANOVA of the same is given in the Table 4.146. Following observations were made:

1. In general, weight gain of layer chicks during fifth week of age-ranged from 50-114 g.

2. The weight gain in layer chicks during fifth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 50-99, 97-114, 83-110, 93-104, 95-109, 50-85, 80-114, 54-83 and 87-110 g, respectively.

3. The mean weight gain in layer chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8, during fifth week of age was76.16, 100.00, 93.33, 98.16, 103, 73.33, 89.33, 72.5, 95.5 g, respectively.

4. The overall mean weight gain of layer chicks, irrespective of treatment, during fifth week of age was 89.03 g.

5. The differences in weight gain of layer chicks due to treatments were significant (Table 4.146).

From the data furnished in Table 4.145, it was noted that layer chicks of T_4 registered highest weight gain (103.00 g) followed by the chicks in T_7 (100.00 g), T_3 (98.16 g), T_8 (95.5 g), T_2 (93.33 g), T_6 (89.33 g), T_0 (76.16 g), T_5 (73.33 g) and T_7 (72.5 g) in fifth week of age. Since the differences in these values of weight gain

were found significant, this indicated significant effect of treatments on weight gain of layer chicks during fifth week of age Chicks in T_7 and T_5 registered significantly less weight gain than T_1, T_2, T_3, T_4 and T_8. The difference in weight gain of chicks between T_1, T_2, T_3, T_4 and T_8 and also between control (T_0), T_2 and T_6 were non-significant. Similarly differences in weight gain of chicks between T_0, T_5, T_6 and T_7 was found non-significant. Chicks in T_1, T_2, T_3, T_4 and T_8 registered significantly higher weight gain.

Table 4.145. Weight gain (g) of layers during fifth week of age in different treatments.

Replications	Treatments									
	Weight gain (g) in layer chicks during fifth week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	67	97	92	100	106	81	99	54	99	87 44
2.	76	90	93	91	95	75	80	64	90	83 77
3.	50	114	110	100	106	79	78	84	110	92.33
4.	99	101	85	93	109	70	66	72	94	87.66
5.	85	94	83	101	97	85	107	83	93	92 0
6.	80	104	97	104	105	50	114	78	87	91 0
Mean	76 16	100	93 33	98 16	103	73 33	89 33	72.5	95 5	89 03

Table 4.146. ANOVA for the data on weight gain (g) in layers during fifth week of age contained in Table 4.145.

Source of variation	d.f	s s	M.S.S	F. Value		Result	C.D
				Cal.	Table (5%)		
Treatments	8	6867 23	858 40	4.66	2.18	S	18.70
Replications	5	500 14	100.02	0.54	2.45	NS	-
Error	40	7367 37	184.14				
Total	53	14734 74					

S = Significant NS = Non-Significant

Mean weight gain in layer chicks at fifth weeks of age (g)

Treatments

T_4	T_1	T_3	T_8	T_2	T_6	T_0	T_5	T_7
103	100	98.16	95.5	93.33	89.33	76.16	73.33	72.5

4.10.6. Weight gain of layer chicks (g) during sixth week of age:

The data regarding weight gain of layer chicks during sixth week of age in different treatments, viz. T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 are presented in Table 4.147 and ANOVA of the same is given in the Table 4.148. Following observations were made:

1. In general, weight gain of layer chicks during sixth week of age-ranged from 80-156 g.
2. The weight gain in layer chicks during sixth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 100-156, 91-115, 80-105, 91-129, 105-126, 95-130, 107-119, 91-125 and 60-128 g, respectively.
3. The mean weight gain in layer chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8, during sixth week of age was 93.3, 106.33, 94.66, 107.16, 112.5, 110.83, 110.66, 104.00, and 106.66 g, respectively.
4. The overall mean weight gain of layer chicks, irrespective of treatment, during sixth week of age was 105.12 g.
5. The differences in weight gain of layer chicks during sixth week of age due to treatments were non-significant (Table 4.148).

The perusal of data on weight gain of layer chicks during sixth week of age contained in Table 4.147, indicated that highest mean weight gain in layer chicks in sixth week of age was recorded in T_4 (112.5 g) followed by T_5 (110.83 g), T_6 (110.66 g), T_3 (107.10 g), T_8 (106.66 g), T_1 (106.33 g), T_7 (104.00 g), T_2 (94.66 g) and T_0 (93.3 g). The differences in these values were found non-significant, indicating thereby a non-significant effect of treatments on the weight gain of layer chicks of different treatments in sixth week of age.

Table 4.147. Weight gain (g) of layers during sixth week of age in different treatments.

Replications	Treatments Weight gain (g) in layer chicks during sixth week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	112	113	105	100	115	119	119	100	117	111 11
2.	126	115	91	91	107	105	110	125	107	108.55
3.	100	100	80	112	126	117	100	91	60	98 44
4.	121	91	99	103	112	95	114	107	126	107 77
5.	138	106	95	129	110	99	107	107	114	111 66
6.	156	113	98	108	105	130	114	94	114	114 66
Mean	93 3	106 33	94.66	107 16	112 5	110 83	110.66	104.0	106 66	105 12

Table 4.148. ANOVA for the data on weight gain (g) in layers during sixth week of age contained in Table 4.147.

Source of variation	d.f	s s	M.S S	F. Value		Result
				Cal	Table (5%)	
Treatments	8	10122	1265.25	2 03	2.18	NS
Replications	5	1406	281 2	0 45	2 45	NS
Error	40	24876	621 9			
Total	53	36404				

NS = Non-Significant

Mean weight gain in layers at sixth week of age (g)

Treatments

T_4	T_5	T_6	T_3	T_8	T_1	T_7	T_2	T_0
112.5	110.83	110.66	107.16	106.66	106.33	104.0	94.66	93.3

4.10.7. Weight gain of layer chicks (g) during seventh week of age:

The data regarding weight gain of layer chicks in different treatments, viz. T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 are presented in Table 4.149 and ANOVA of the same is given in the Table 4.150. Following observations were made.

1. In general, weight gain of layer chicks during seventh week of age-ranged from 63-244 g.

2. The weight gain of layer chicks during seventh week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 80-193.36, 68.220.3, 70-188.2, 63-244, 79-192.6, 69-220, 80-181.2, 80-211 and 77-176.8 g, respectively.

3. The mean weight gain of layer chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8, during seven weeks of age was 109.5, 113.7, 110.7, 115.6, 118.6. 117.6, 118.7, 117.5, 109.4 g, respectively.

4. The overall mean weight gain of layer chicks in seventh week of age, irrespective of treatment, during seven weeks of age was 687.18 g.

5. The differences in weight gain of layer chicks in seventh week of age due to treatments were significant (Table 4.150).

The perusal of data on weight gain of layer chicks in seventh week of age in Table 4.149, indicated that highest mean weight gain in layer

chicks was recorded in T_6 (118.7 g) followed by T_4 (118.6 g), T_3 (117.11 g), T_7 (117.5 g), T_5 (115.0 g), T_2 (110.7 g), T_1 (113.7 g), T_0 (109.5 g) and T_8 (109.4 g). The differences in these values were found significant indicating thereby a significant effect of treatments on the weight gain of layer chicks of different treatments in seventh week of age. weight gain in chicks of control was found at par with weight gain of chicks in T_1, T_2 and T_8. weight gain in chicks of T_3 in seventh week of age was at par with chicks of T_1. The differences in weight gain of chicks between T_3, T_4, T_5, T_6 and T_7 were not significant but registered significantly higher weight gain in seventh week than chicks of T_0, T_2, and T_8.

Table 4.149. Weight gain (g) of layers during seventh week of age in different treatments.

Replications	Treatments weight gain (g) in layer chicks during seventh week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1	97	70	89	67	89	69	94	86	95	84.0
2.	86	68	78	79	79	71	82	80	93	79 35
3.	120	74	70	65	85	83	80	75	120	85.77
4.	80	71	85	63	98	87	95	80	95	83.77
5.	80.64	179	154	172	168	175 6	180	173	77	151 02
6.	193 36	220.3	188 2	244	192 6	220	181.2	211	176.8	203.05
Mean	109 5	113 7	110 7	115.0	118 6	117 6	118 7	117.5	109 4	114 52

Table 4.150. ANOVA for the data on weight gain (g) in layers during seventh week of age contained in Table 4.149.

Source of variation	d f	s.s	M S S	F. Value		Result	C.D
				Cal.	Table (5%)		
Treatments	8	18637 09	2329 63	11.83	2 18	S	13 64
Replications	5	115136 26	23027 25	116 96	2.45	S	15 31
Error	40	7875 06	196 87				
Total	53	141648 41					

S = Significant

Mean gain weight in layers at seventh week of age (g)

Treatments

T_6	T_4	T_5	T_7	T_3	T_1	T_2	T_0	T_8
118.7	118.6	117.6	117.5	115.0	113.7	110.7	109.5	109.4

4.10.8. Weight gain of layer chicks (g) during eighth week of age:

The data regarding weight gain of layer chicks in different treatments, viz. T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 are presented in Table 4.151 and ANOVA of the same is given in the Table 4.152. Following observations were made.

1. In general, weight gain of layer chicks during eighth week of age-ranged from 30-245.6 g.

2. The weight gain in layer chicks in eighth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 ranged from 84-139, 67-164, 63-165.2, 53-190.2, 66-245.6, 65-232, 62-205.6, 56-243, 30-255.6 g, respectively.

3. The mean weight gain of layer chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8, during eight weeks of age was110.6, 118.6, 116.2, 116.2, 117.6, 117.5, 125.6, 126.7 and 124.6 g, respectively.

4. The overall mean weight gain of layer chicks, irrespective of treatment, during eighth week of age was 111.52 g.

5. The differences in weight gain of layer chicks due to treatments were significant (Table 4.152).

The perusal of data on weight gain of layer chicks during eighth week of age contained in Table 4.151, indicated that highest mean gain in layer chicks was recorded in T_7 (126.7 g) followed by T_6 (125.6 g), T_8 (124.6 g), T_1 (118.6 g), T_4 (117.6 g), T_5 (117.5 g), T_3 (116.2 g), T_2 (116.2 g)

and T_0 (110.6 g). The differences in these values were found significant indicating thereby a significant effect of treatments on the weight gain of layer chicks of different treatments. Chicks of T_6, T_7 and T_8 registered significantly higher weight gain during 8th week of age than chicks in T_0, T_1, T_2, T_3, T_4 and T_5. The control (T_0) was also found at par with T_1, T_2, T_3, T_4 and T_5 as the differences in weight gain during eight weeks of age were not significant.

Table 4.151. Weight gain (g) of layers during eighth week of age in different treatments.

Replications	Treatments Weight gain (g) in layer chicks during eighth week of age									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1	84	67	65	53	71	65	85	58	67	68 33
2.	139	77	63	59	66	72	77	57	75	76 11
3	106	164	80	57	91	69	62	56	30	79 44
4.	93	160	167	170	106	121	155	167	57	144 01
5	125	155	157	168	106	146	169	1 9	63	152 40
6.	111 6	148 6	165 2	190 2	245 6	232	205 6	213	255 6	199 7
Mean	110 6	118 6	116 2	116 2	117 6	117 5	125.6	126 7	124 6	119 23

Table 4.152. ANOVA for the data on weight gain (g) in layers during eighth week of age contained in Table 4.151.

Source of variation	d f	s s	M S S	F Value		Result	C D
				Cal	Table (5%)		
Treatments	8	1344	168	2.19	2.18	S	8 52
Replications	5	136073 33	27214 66	355	2 45	S	9.58
Error	40	3060 06	76 50				
Total	53	140477 39					

S = Significant

Mean weight gain in layers during eighth week of age (g)

Treatments

T_7	T_6	T_8	T_1	T_4	T_5	T_3	T_2	T_0
126.7	125.6	124.6	118.6	117.6	117.5	116.2	116.2	110.6

4.10.9. Weekly weight gain in layer chicks (g):

The data regarding body weight gain of layer chicks are presented in Table 4.153, Figure 4.19, Figure 4.20 and ANOVA of the same is given in Table 4.154. Following observations were made:

1. Irrespective of treatment, the body weight gain of layer chicks during first, second, third, fourth, fifth, sixth, seventh and eighth weeks of age ranged from 25.33-31, 35-50.66, 47.67-57.5, 65 84-76.16, 72.5-104, 93.6-112.5, 109.4-178.7, and 110.6-126.7 g, respectively.

2. Irrespective of treatment mean weekly body weight gain in chicks in first, second, third, fourth, fifth, sixth, seventh and eighth weeks of age was 73.81, 85.72, 75.4, 78.67, 79.9, 79.07, 77.06 and 79.59, respectively.

3. The weight gain in layer chicks during eighth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 110.6, 118.6, 116.2, 116.2, 117.6, 117.5, 125.6, 126.7, 124.6 g, respectively.

4. The mean weekly body weight gain in layer chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 73.81, 85.72, 75.40, 79.67, 79.9, 79.07, 79.01, 77.06, and 79.59, respectively.

5. The differences in the weight gain of layer chicks were found non-significant, (Table 4.154).

The perusal of data on weight gain of layer chicks contained in Table 4.153, indicated that there was an increase in weight gain with the

increase in age of layer chicks. This was as expected The highest weight gain was recorded in eighth week (119.28 g) followed by seventh (114.52 g), sixth (105.21 g), fifth (89.53 g), fourth (77.83 g), third (57.60 g), second (48.81 g), and first week of age (28.64 g). The differences in these values of weight gain were found significant indicating a significant effect of age on weight gain and it was as expected. However, the weight gain of layer chicks between first and second week was not significantly different. Regard to the effect of treatments it was noted that the layer chicks of T_1 group registered highest mean weekly weight gain (85.72 g) followed by T_4 (79.9 g), T_3 (79.67 g), T_8 (79.59 g), T_5 (79.07 g), T_7 (77.06 g), T_6 (79.01), T_2 (75.40 g), and T_0 (73.81 g). However, the differences between these values of weight gain were found non-significant, which indicated a non-significant effect of treatments on weekly weight gain of layer chicks.

Table 4.153. Weekly average weight gain (g) in layers of different treatments.

Weeks	Treatments Weekly average weight gain (g) of layer chicks									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1	27.16	30 5	26 16	30 0	25 33	31	27.5	31 0	29.16	28 64
2.	44 48	43 53	44 0	42.67	41 0	48 66	35 0	39 33	50.66	48 81
3	54.08	47 67	53 33	56 17	51 84	57 5	52 0	51 16	49 66	52 60
4.	73.42	70.99	65 84	72.0	69 33	76 16	73.33	74.33	71.11	71.83
5.	77.67	104 0	92 33	98 16	103 0	73.33	89.33	72.5	95 5	89 53
6.	93.6	106.83	94 66	107 16	112 5	110 83	110.66	104 0	106 66	105 21
7.	109.5	113.7	110 7	115 0	116 6	117 6	118 7	117 5	109.4	114 52
8.	110.6	118 6	116 2	116 2	117 6	117 5	125.6	126 7	124 3	119 28
Mean	73.81	85.72	75 40	79.67	117 6	79.07	79 01	77.06	79 59	78 60

Table 4.154. ANOVA for the data on weekly average weight gain (g) in layers contained in Table 4.153.

Source of variation	d.f	s s	M S S	F. Value		Result	C.D
				Cal.	Table (5%)		
Treatments	8	720.96	9012.00	1 33	2.7	NS	-
Replications	7	70899 53	10128 56	138.36	2.8	S	9.05
Error	56	4099 75	73.20				
Total	71	76720 24					

S = Significant NS = Non-significant

Weekly mean weight gain of layers (g) in treatments

Treatments

T_1	T_4	T_3	T_8	T_5	T_7	T_6	T_2	T_0
85.72	79.9	79.67	79.59	79.07	77.06	79.01	75.40	73.81

Week-wise mean weight gain of layers (g)

Weeks

W_8	W_7	W_6	W_5	W_4	W_3	W_2	W_1
119.28	114.52	105.21	89.53	71.85	52.60	48.81	28.64

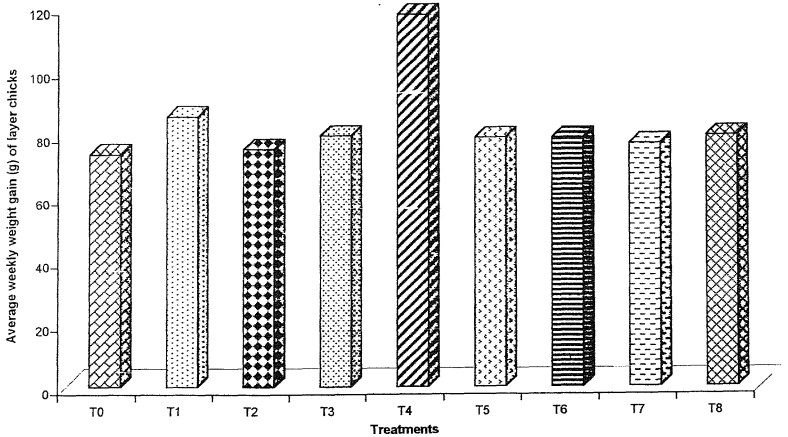


Figure 4.19. Weekly average weight gain (g) of layers in different treatments

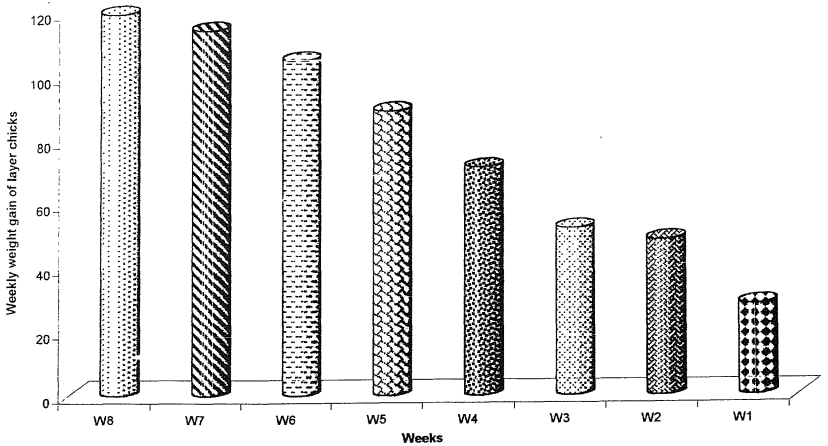


Figure 4.20. Week-wise mean weight gain (g) of layers in different treatments

4.11. Weekly average feed consumption of layer chicks:

The data regarding weekly feed consumption of layer chicks in different treatments are presented in Table 4.155, Fig 4.21, 4.22 and ANOVA of the same is given in Table 4.156. Following observations were made:

1. Irrespective of treatment, the average feed consumption of layer chicks at the age of first, second, third, fourth, fifth, sixth, seventh and eighth week of age ranged from 57.16-71.13, 83-119.16, 110.33-179.33, 200-268.33, 229.3-329.19, 328.33-389.16 and 366.33-458.3 g, respectively.

2. The mean feed consumption per layer chick irrespective of treatment during first, second, third, fourth, fifth, sixth, seventh and eighth week of age was 66.84, 105.94, 153.27, 225.92, 282.92, 324.55, 355.51 and 407.85 g, respectively.

3. The average feed consumption per layer chick in eighth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 396.0, 394.5, 373.33, 436.0, 458.3, 401.7, 393.33, 454.16, 363.33 g, respectively.

4. The mean weekly feed consumption per layer chick in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 221.71, 251.68, 222.01, 235.53, 252.90, 241.25, 215.70, 261.87, 233.52 g, respectively.

5. The differences in weekly average feed consumption of layer chicks between weeks were significant. (Table-4.156).

From the perusal of data on treatment wise weekly average feed consumption in layer chicks contained in Table- 4.155 and Fig 4.21 & 4.22. It was observed that the highest feed consumption of layer chicks irrespective of treatment, was recorded during eighth week was 407.05 g followed by seventh (355.51 g), sixth (324.55 g), fifth (288.92 g), fourth (225.92 g), third (153.27 g), second (105.94 g) and first week (66.84 g). The differences in these values were found significant indicating thereby a significant effect of age on feed consumption of layer chicks. These results were as expected because of increase in requirement of feed with increase in age and consequently feed intake increases with the age of layer chicks. The layer chicks during first week registered significantly lowest feed consumption than the layer chicks of second, third, four, five, six, seven and eight weeks. However, the differences between the feed consumption of layer chicks between first and second week and between five and six weeks were non-significant, being at par. As far as the effect of treatments on feed consumption on layer chicks is concerned, the highest average weekly feed consumption per layer chicks was recorded in T_7 (261.87 g) followed by T_4 (252.90 g), T_1 (251.68 g), T_3 (241.25 g), T_5 (255.53 g), T_8 (233.52 g), T_2 (222.01 g), T_0 (221.71 g) and T_6 (215.70 g) and the differences in these values were found significant indicating thereby a significant effect of treatments on weekly feed consumption of layer chicks.

Table 4.155. Weekly average feed consumption of layers (g) in different treatments

Weeks	Treatments Weekly average feed consumption of layer chicks (g)									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1	65 33	63 0	58 16	69 5	57 16	67 99	63 33	85 99	71 13	66 84
2	83 0	114 5	92 66	119 16	118 33	106 16	103 33	112 66	103 66	105 94
3	141.66	179 33	110 33	169 66	159 5	177 5	134 99	161 33	145 16	153 27
4.	200 0	235 83	216 98	219 99	259 99	207 5	213 83	210 83	268 33	225 92
5	253 0	320 0	296 0	229 3	257 99	281 7	312 49	329 19	266 66	282 92
6	296.7	339.16	300 3	292 33	370 0	309 16	343.33	351 7	318.33	324 55
7.	338.0	367 16	328 33	348.33	342 0	378.33	376 7	3[illegible]9.16	331 6	355 51
8.	396.0	394.5	373 33	436 0	458.3	401 7	393 33	454.16	363.33	407 85
Mean	221 71	251.68	222 01	235 53	252 90	241 25	215 70	261 87	233 52	237 35

Table 4.156. ANOVA for the data on average weekly feed consumption of layers (g) contained in Table 4.155.

Source of variation	d.f	s s	M.S S	F Value		Result	C D
				Cal.	Table (5%)		
Treatments	8	12249 25	1531 15	3 22	2 7	S	22.21
Replications	7	956187 68	136598 24	288 13	2 8	S	23 04
Error	56	26547.3	474 05				
Total	71	994984.23					

S = Significant

Mean feed consumption of layers (g) in treatments

Treatments								
T_7	T_4	T_1	T_5	T_3	T_8	T_2	T_0	T_6
261.87	252.90	251.68	241.25	235.53	233.52	222.01	221.71	215.70

Week-wise mean feed consumption of layers (g)

Treatments							
W_8	W_7	W_6	W_5	W_4	W_3	W_2	W_1
407.05	355.51	324.55	282.92	225.92	153.27	105.94	66 84

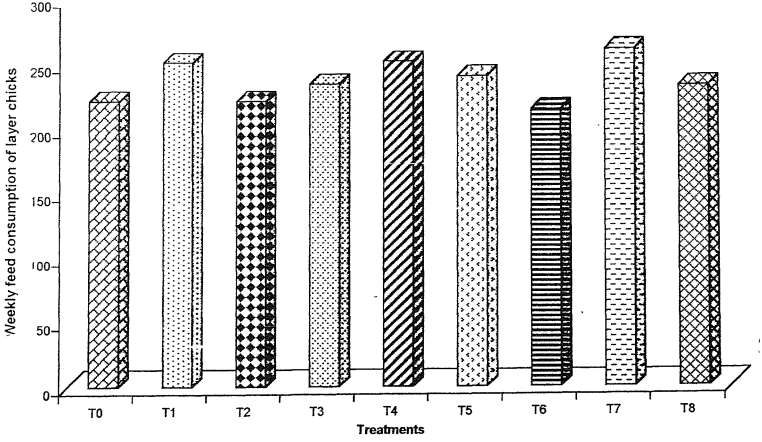


Figure 4.21. Weekly feed consumption of layers (g) in different treatments

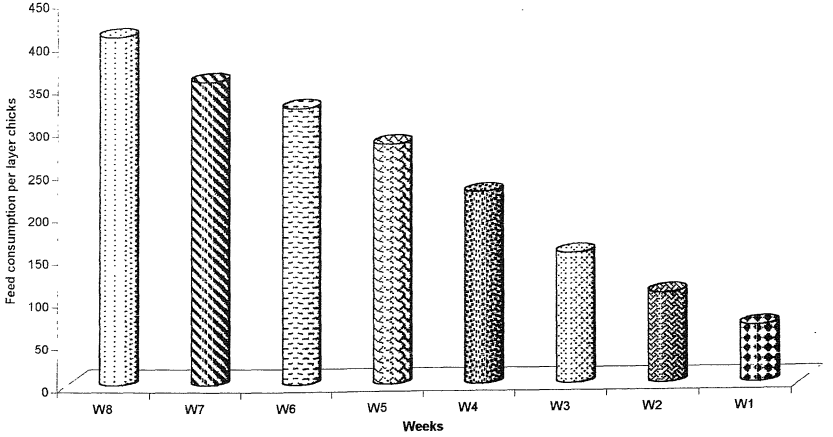


Figure 4.22. Week-wise feed consumption (g) of layer chicks in different treatments

4.12. Weekly average feed conversion ratio (F.C.R) of layer chicks in different treatments (kg of feed/kg weight gain):

The data regarding weekly feed conversion ratio of layer chicks in different treatments are presented in Table 4.157 , Figure 4.23, 4.24 and ANOVA of the same is given in Table 4.158. The following observations were made:

1. Irrespective of treatment, the average feed conversion ratioper layer chick in first, second, third, fourth, fifth, sixth, seventh and eighth week of age ranged from 2.06-2.77, 1.85-2.88, 2.06-3.76, 2.72-3.77, 2.33-4.54, 2.72-3 38, 2.96-3.22 and 2.90-3.89 g, respectively

2. The mean feed conversion ratio of layer chick, irrespective of treatments, during first, second, third, fourth, fifth, sixth, seventh and eighth week of age was 2.32, 2 48, 2.91, 3 14, 3.29, 3.87, 3.10 and 3.43 kg, respectively.

3. The overall average feed conversion ratio of layer chicks in eighth week of age in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 3.58, 3.32, 3.31, 3.75, 3.89, 3.41, 3.13, 3.58 and 2.90 kg, respectively

4. The mean feed conversion ratio of layer chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 2.92, 3.06, 2.79, 2.86, 3.11, 2.92, 2.95, 3.27 and 2.85 kg, respectively.

5. The differences in weekly average feed conversion ratio of layer chicks due to treatment were non-significant but due to weeks were significant (Table 4.158).

From the perusal of data contained in Table 4.157 and Figure 4.23 , 4.24, it may be noted that the highest weekly feed conversion ratio of layer chicks was recorded in T_7 (3.27) followed by T_4 (3.11), T_1 (3.06), T_6 (2.95), T_5 (2.92), T_0 (2.92), T_3 (2.86), T_8 (2.85) and T_2 (2.79). The differences between these values were found non-significant. The highest feed conversion ratio of layer chicks, irrespective of treatment was recorded during eighth week (3.43) followed by seventh week (3.10), fifth (3.29), fourth (3.14), sixth (3.07), third (2.91) second (2.48) and first week of age (2.32). The differences in these values of F.C.R. were found significant indicating thereby a significant effect of age on feed conversion ratio of layer chicks. The layer chicks during the eight-week of age registered significantly higher F.C.R than the layer chicks during first and second week. However, the differences in feed conversion ratio of layer chicks during fourth, fifth, seventh and eighth were found non-significant being at par. Similarly F.C.R in layer chicks during first and second week was non significantly different. The differences in F.C.R of layer chicks during fourth, fifth, seventh and eighth week were also found non-significant being at par.

Table 4.157. Weekly average feed conversion ratio (kg) of layers in different treatments.

Weeks	Treatments Weekly average feed conversion ratio of layer chicks									
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	Mean
1.	2 40	2.06	2 22	2 31	2.25	2 19	2 30	2.77	2 43	2.32
2.	1.85	2 73	2 10	2 76	2 88	2 18	2 95	2 86	2 04	2 48
3	2.62	3 76	2 06	3.02	3 07	3 08	2 59	3 15	2 92	2 91
4.	2.72	3.17	3 34	3.05	3 75	2 72	2 91	2 83	3 77	3 14
5.	3.95	3 07	3 20	2 33	2 5	3 84	3 49	4 54	2 77	3.29
6.	3.16	3.17	3 17	2.72	3.28	2 74	3 10	3 38	2 94	3 07
7.	3.08	3 22	2 96	2 97	3 27	3 21	3 17	3 07	3 03	3 10
8	3.58	3.32	3 31	3.75	3.89	3 41	3 13	3 58	2 90	3 43
Mean	2.92	3.06	2 79	2.84	3.11	2 92	2.95	3.27	2 85	2 99

Table 4.158. ANOVA for the data on weekly average feed conversion ratio (kg) of layers contained in Table 4.157.

Source of variation	d f	s.s	M.S S	F. Value		Result	C.D
				Cal	Table (5%)		
Treatments	8	1.41	0.17	1.17	2.7	NS	-
Replications	7	9 31	1.33	8 86	2.8	S	0 40
Error	56	8 61	0 15				
Total	71	19 33					

S = Significant NS = Non-Significant

Mean feed conversion ratio (Kg) of layers in treatments

Treatments								
T_7	T_4	T_1	T_5	T_3	T_8	T_2	T_0	T_6
3.27	3.11	3.06	2.95	2.92	2.92	2.86	2.85	2.79

Week-wise mean feed conversion ratio of layers (kg)

Weeks							
VIII	VII	VI	V	IV	III	II	I
3.43	3.10	3.29	3.14	3.07	2.91	2.48	2.32

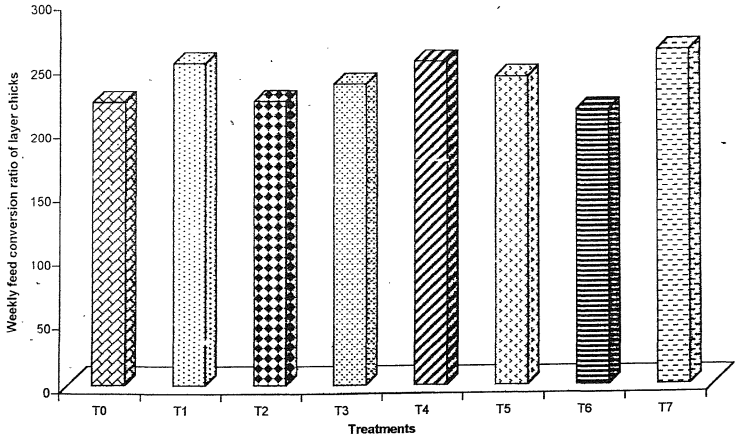


Figure 4.23. Weekly feed conversion ratio (kg) of layer chicks in different treatments

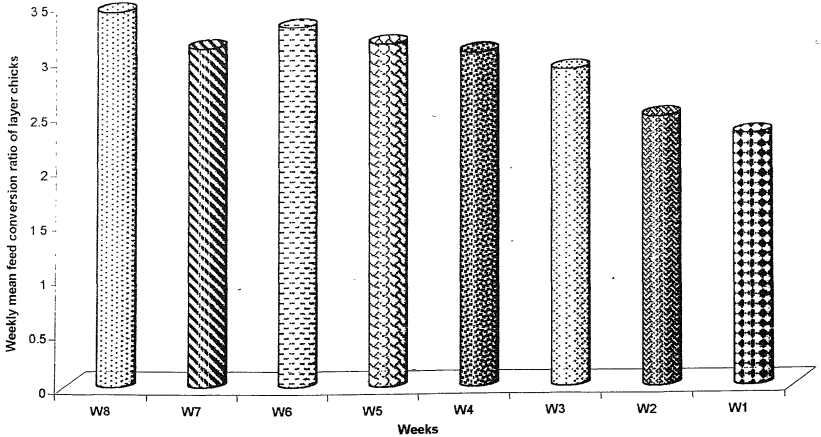
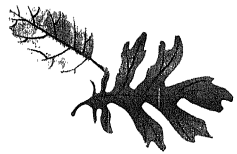


Fig 4.24. Week-wise mean feed conversion ratio (kg) of layer chicks in different treatments



CHAPTER - V

Summary and Conclusion

SUMMARY AND CONCLUSION

Mentha (mint), commonly known as "Pudina" is a medicinal plant used for digestive disorders in human beings during summer months. Poultry have simple stomach like human beings. Owing to the beneficial effect of mint in digestion utilization of it may help to improve performance of birds. With this in view the present study was planned to determine the study of the effect of mentha along with proximate nutrients on the performance of chicks.

The study consisted of three experiments viz. broilers, cockerels and layer chicks. In each experiment day-old, 108 commercial chicks of the same hatch were divided into 9 groups of 12 chicks in each, for treatments (T) as follows:

Treatments	**Test rations**
T_0	Ration with zero (0) percent mentha.
T_1	Ration with 0.25 percent mentha.
T_2	Ration with 0.50 percept mentha.
T_3	Ration with 0.75 percent mentha.
T_4	Ration with 1.00 percent mentha.
T_5	Ration with 1.25 percent mentha.
T_6	Ration with 1. 50 percent mentha.
T_7	Ration with 1.75 percent. mentha.
T_8	Ration with 2.00 percent mentha.

Chicks were reared in cages with sufficient space (0.8 sq. ft. per chicks), ventilation and similar management conditions and fed ration ad. lib. First experiment on broiler was made upto six weeks and then later two experiments i.e cockerels and layer chicks were made upto 8 weeks. Broiler starter ration was fed upto 4 weeks and then finisher, ration upto 6 weeks. Cockerels and layer chicks were fed chick starter ration upto eight weeks. The data on weekly body weight, feed consumption, weight gain and feed conversion ratio (F.C.R) were collected and analyzed statistically.

BROILERS:

Initial body weight of chicks in different treatments ranged from 34-44 g and the differences in these were non-significant. Highest mean body weight of broilers was recorded as T_4, T_7, T_8, T_6, T_5, T_3, T_0, T_1 and T_2 was 635.38, 626.24, 599.35, 575.33, 571.30, 566.66, 559.94, 537.47 and 486.94 g, respectively and the difference in these were significant. Mean body weight of broilers in T_8 compared to those in T_0, T_3, T_5 and T_6 were significantly higher. T_2 registered significantly less body weight of broilers than all other treatments. Control and T_1 registered significantly less body weight of broilers than all other treatments. Control and T_1 were found at par. Broiler in T_1 also had significantly less body weight than broilers of T_3, T_5 and T_6 body weight of broilers of T_0, T_3, T_5 and T_6 was not significantly different. Irrespective of treatment the mean body weight of broiler in general in first, second third, fourth, fifth and sixth week was 98.2, 203.7, 359.4, 616.4, 949.0 and 1212.2 g, respectively which were significantly different. The mean weight gain of broilers during six weeks in T_0, T_1, T_2,

T_3, T_4, T_5, T_6, T_7 and T_8 was 216.66, 241.66, 205.0, 245.0, 273.33, 270.0, 296.66, 295.0 and 341.66 g, respectively. The differences were non-significant. The weekly mean weight gain of broilers in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7 and T_8 was 192.66, 177.38, 162.05, 193.48, 209.02, 195.08, 195.74, 216.13 and 214.63 g, respectively, which were also non-significant.

Irrespective of treatment the highest feed consumption in broiler was recorded during sixth week (650.18 g) followed by fifth (617.59 g), fourth (434.81 g), third (244.81 g), second (218.77 g) and first week (125.10 g) and the differences in these were significant. The highest mean feed consumption for broilers (g) was recorded in T_0 (420.2), followed by T_8 (417.2), T_4 (413.2), T_7 (388.6), T_6 (380.5), T_5 (372.7), T_7 (367.7), T_3 (361.9) and T_2 (314.4) but the difference in these were non-significant. The highest weekly F.C.R of broiler was recorded in T_0 (2.38) followed by T_1 (2.16), T_3 (2.03), T_4 (1.96), T_6 (1.93), T_8 (1.81), T_7 (1.80) and T_5 (1.78) and the differences in these were non-significant. With regards to effect of age the highest F.C.R of broilers, irrespective of treatment was recorded during sixth week (2.50) followed by second (2.15), first (2.12), fifth (1.82), fourth (1.71) and third week (1.61). The differences in these values were significant. The broilers during sixth week of age registered significantly higher F.C.R than the broilers at third, fourth and fifth week.

At the end of experiment one bird from each group was slaughtered and the meat quality by Hedonic score by 20 judges was judged. The broilers of T_7 registered best quality meat followed by the broilers of T_8, T_6, T_4, T_5, T_3, T_1, T_2 and T_0. It was concluded that there was a significant

effect of mentha on body weight of broilers on ration containing mentha @ 1%. However, no significant differences were observed on weight gain and feed consumption and feed conversion ratio of broilers between different treatments. Therefore, inclusion of mentha was not found to be beneficial on the performance of broilers.

Treatments arranged in increasing/decreasing order based on mean value of parameters

Parameters	Mean values of parameters								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
Body weight of day-old broilers (g)	38.66 (a)	39.16 (a)	39.33 (a)	40.66 (a)	39.33 (a)	38.50 (a)	38.83 (a)	39.83 (a)	40.50 (a)
Final body weight of broilers at six weeks (g)	1160.0 (a)	1128.3 (a)	1011.6 (a)	1201.6 (a)	1326.6 (a)	1238.3 (a)	1213.3 (a)	1336.6 (a)	1323.3 (a)
Weekly mean body weight of broilers (g)	5595.9 (a,b)	537.47 (a)	486.94	566.66 (b)	635.38 (c)	571.30 (b)	575.33 (b)	626.24 (c)	599.35
Gain in weight at six week of age (g)	216.66 (a)	241.66 (a)	205.0 (a)	245.0 (a)	273.33 (a)	270.0 (a)	296.66 (a)	295.0 (a)	341.66 (a)
Weekly weight gain of broilers (g)	192.66 (a)	177.38 (a)	162.05 (a)	193.49 (a)	209.02 (a)	195.08 (a)	195.74 (a)	216.13 (a)	241.63 (a)
Weekly feed consumption per broiler	420.27 (a)	367.77 (a)	314.44 (a)	361.94 (a)	413.32 (a)	372.77 (a)	380.55 (a)	388.60 (a)	417.21 (a)
Mean F.C.R at six week of age (kg)	2.36 (a)	2.93 (a)	2.68 (a)	2.71 (a)	2.90 (a)	2.66 (a)	1.98 (a)	2.20 (a)	2.40 (a)
Weekly average F.C.R. of broilers	2.38 (a)	2.16 (a)	2.0 (a)	2.03 (a)	1.96 (a)	1.78 (a)	1.93 (a)	1.80 (a)	1.81 (a)

Similar alphabets on values in parameters indicate non-significant differences

COCKERELS:

The highest mean body weight of cockerels at eight weeks age was recorded in 675, 660, 663.7, 625, 610, 600, 541.8, 552.5 and 523.3(g) in T_2, T_3,T_7, T_4, T_8, T_5, T_0, T_6, and T_1 respectively. The differences in these values were found significant.

The highest weekly weight gain of cockerels irrespective of treatment in Ist, IInd, IIIrd, IVth, Vth, VIh, VIIth, and VIIIth weeks was 16.76g, 27.51g, 43.0g, 42.8g, 79.03g, 95.3g, 150.5g, 90.3g respectively. The differences in these value were found significant.

The highest average feed consumption (kg) per cockerel during eight weeks age was recorded in T_3 (2.16) followed by T_2 (1.9), T_1 (1.76), T_8 (1.42), T_0 (1.39), T_4 (1.19), T_6 (1.49), T_5 (1.17) and T_7 (1.15 kg) and the differences these value were found significant.

The mean feed consumption per cockerel irrespective of treatment in Ist, IInd, IIIrd, IVth, Vth, VIh, VIIth, and VIIIth weeks age was 62.1, 88.7, 113.1, 145.4, 173.9, 222, 308.8 and 383 g, respectively and differences in then were found significant.

The best-feed conversion ratio of was recorded in T_7 (1.92 kg) followed by T_5 (2.06 kg), T_4 (2.22 kg), T_6 (2.29 kg), T_8 (2.47 kg), T_0 (2.49 kg), T_2 (2.96 kg), T_3 (3.47 kg) and T_1 (3.58 kg).

Therefore T_7 was considered the best test ration followed by T_5. The remaining treatments were found at par with control. Therefore inclusion of Mentha @ 1.75% in ration was recommended for rearing the cockerels.

Treatments arranged in increasing/decreasing order based on mean value of parameters:

Parameters	Mean value of parameters								
	T_3	T_2	T_7	T_9	T_6	T_8	T_4	T_1	T_5
Initial body weight of cockerels (g)	35.5	34	34	33 6	33 3	33 16	33 0	31 5	31 5
	a	a	a	a	a	a	a	a	a
	T_2	T_3	T_7	T_4	T_8	T_5	T_9	T_6	T_1
Body weight of eight weeks cockerels (g)	675	660	633 7	625.0	610	600	591.8	552.5	523.3
	a	a	a	ab	ab	abc	bc	bc	c
	T_2	T_3	T_7	T_4	T_8	T5	T_9	T_6	T_1
weight gain of cockerels during eight weeks of age (g)	641	625 5	599 7	592 0	576 4	568 5	558 6	519 2	491 8
	a	a	abc	abc	ab	bc	abc	c	c
	T_3	T_2	T_1	T_5	T_9	T_4	T_6	T_8	T_7
Feed consumption in cockerel during eight weeks (kg)	2 16	1 90	1 76	1 42	1 39	1.31	1.19	1 17	1.15
		a	a	b	bc	bc	bc	bc	c
	T_7	T_5	T_4	T_6	T_8	T_9	T_2	T_3	T_1
Feed Conversion Ratio (F.C.R) efficiency (kg feed/kg weight gain)	1.92	2.06	2.22	2.29	2.47	2 49	2.96	3.47	3.58
	a	ab	abc	bc	c	c	e	d	d

Similar alphabets on values in parameters indicate non-signi icant differences

LAYERS:

Initial body weight of chicks in different treatments ranged from 27 to 39 and the differences in these were non-significant. Highest mean body weight of layer chicks was recorded as T_4, T_3, T_8, T_5, T_7, T_2, T_1, T_6, and T_0 was 321.78, 320.17, 317.07, 316.35, 312.72, 300 67, 300.63, 299.00 and 298.95 g, respectively and the difference in these were significant. Mean body weight of broilers in T_4 was at par with T_3 but both treatments significantly higher body weight of layer chicks than other treatments. Similarly body weight of layer chicks in T_8 compared to those in T_7, T_1, T_2 and T_5 were significantly higher T_0 registered significantly less body weight of layer chicks than all other treatments. Control and T_6 were found at par. Layer chicks in T_6 also had significantly less body weight than layer chicks of T_3, T_8 and T_7 Body weight of broilers of T_7, T_2, T_1 and T_5 was not significantly different. Irrespective of treatment the mean body weight of layer chicks in general in first, second, third, four, five, six, seven and eight weeks were 58.9, 102.2, 154.80, 237.77, 313 67, 420.61, 535.31 and 580.98 g, respectively, which were significantly different.

The mean weight gain of layer chicks during eight weeks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 110.6, 118.6, 116.2, 116.2, 117.6, 117.6, 125.6, 126.7 and 124.6 g, respectively, but the differences were not significant. The weekly mean weight gain of layer chicks in T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 was 73.81, 85.72, 75.40, 79.67, 79.9, 79.07, 79.01, 77.06 and 79.59 g, respectively, which were also non-significant.

Irrespective of treatment the highest feed consumption in layer chicks recorded during eighth week of age (407.05 g) followed by seventh

(355.51 g), sixth (324.55 g), fifth (288.92 g), fourth (225.92 g), third (153.27 g), second (105.94 g) and first week (66.84 g) and the differences in these were significant. The highest mean feed consumption for layer chicks (g) was recorded in T_7 (261.87 g) followed by T_4 (252.90 g), T_1 (251.68 g), T_3 (241.25 g), T_5 (255.53 g), T_8 (233.52 g), T_2 (222.01 g), T_0 (221.71 g) and T_6 (215.70 g) and the differences were found significant.

The higher weekly feed conversion ratio of layer chicks was recorded in T_7 (3.27) followed by T_4 (3.11), T_1 (3.06), T_6 (2.95), T_5 (2.92), T_0 (2.92), T_3 (2.86), T_8 (2.85) and T_2 (2.79) and the differences in these were non-significant. With regards to effect of age the highest F.C.R of layer chicks, irrespective of treatment was recorded during eighth week (3.43) followed by seventh week (3.10), fifth (3.29), fourth (3.14), sixth (3.07), third (2.91) second (2.48) and first (2.32). The differences in these values were significant. The layer chicks during eighth week of age registered significantly higher F.C.R than the layer chicks at first and second.

At the end of experiment one bird from each group was slaughtered and the meat quality by Hedonic score by 20 judges was judged. The layer chicks of T_8 registered best quality mean followed by the layer chicks of T_7, T_6, T_4, T_5, T_3, T_1, T_2, and T_0.

It was concluded that there was a significant effect of mentha on body weight of layer chicks on ration containing mentha @ 1 %. However, no significant differences were observed on weight gain and feed consumption and feed conversion ratio of layer chicks between different treatments. Therefore, inclusion of mentha was not found to be beneficial on the performance of layer chicks.

Treatments arranged in increasing/decreasing order based on mean value of parameters:

Parameters	Mean values of parameters								
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
Body weight of day-old layer chicks (g)	31 33 (a)	30 33 (a)	31 00 (a)	31 33 (a)	31 66 (a)	30 00 (a)	32 00 (a)	31 66 (a)	30 16 (a)
Final body weight of birds at eight weeks (g)	621.80 (a)	664 60 (a)	634 20 (a)	672 80 (a)	667 08 (a)	662 53 (a)	648 67 (a)	646 26 (a)	673 33 (a)
Weekly mean body weight of layer chicks (g)	298.95 (a)	312 72 (a)	300.67 (a)	320 17 (a)	321 78 (a)	316.35 (a)	299.00 (a)	300.63 (a)	317 07 (a)
Weight gain at eight weeks of age (g)	110 6 (b)	118 6 (b)	116 2 (b)	116.2 (b)	117.6 (b)	117.5 (b)	125.0 (a)	126.7 (a)	124 6 (a)
Weekly weight gain of layer chicks (g)	73 81 (a)	85 72 (a)	75.40 (a)	79 67 (a)	79.9 (a)	79 07 (a)	79.01 (a)	77 06 (a)	79.59 (a)
Weekly feed consumption per bird	221.71 (b)	251 68 (a)	222.01 (b)	235 53 (b)	252 90 (a)	241.25 (b)	215.70 (b)	261.87 (a)	233.52 (b)
Weekly average feed consumption ratio (kg) of birds	2.92 (a)	3 06 (a)	2.79 (a)	2 86 (a)	3 11 (a)	2.92 (a)	2.95 (a)	3.27 (a)	2.85 (a)

Similar alphabets on values in parameters indicate non-significant differences

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Academic degree	:	M.Sc., Animal Science
Place of publication	:	University of Allahabad, Allahabad, U.P., India
Publisher/Institution	:	Allahabad University, and Faculty of Veterinary Science and Animal Husbandry, A.A.I.D.U., Allahabad
Date of publication	:	Year 2003
Collation	:	Page 234
Language of text	:	English
Availability	:	Central Library, Allahabad University, Allahabad, Agricultural Institute – Deemed University, Allahabad, and CIMAP, Lucknow.
Key words	:	Mentha, Broilers, Cockerels, Layer chicks

Abstract : A feeding trial of six weeks duration on 108 day old broiler and eight weeks duration on 108 day old cockerels and layers was undertaken to the study of effect of the mentha (mint) along with proximate nutrients on the performance of chicks were fed self prepared standard ration containing mentha @ nil for control (T_0), 0.25, 0.50, 0.75, 1.0, 1.25, 1.5, 1.75 and 2.0 % for T_1, T_2, T_3, T_4, T_5, T_6, T_7, and T_8 as treatments on the basis of body weight, weight gain, feed consumption, feed conversion ratio and meat quality the chicks in T-showed best performance which was significant. Therefore the ration containing 1.75% mentha was adjusted the best treatment.

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Place: Allahabad
Date: 25.9.2003

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